

Engineering Report

Process Water Treatment System

Canton Drop Forge 4575 Southway Street, SW Canton Ohio

September 2013



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Prepared For Canton Drop Forge

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TRC Environmental | Canton Drop Forge Final X:\WPAAM\PJT2\199385\0000\PTI\R1993850000-001.DOCX

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Section 1 Project Summary and Objectives

Canton Drop Forge (CDF) will implement several process water management and piping modifications at their Perry Township, Stark County, Ohio facility (Figure 1) to eliminate the inadvertent release of process water and oil to on-site storm water retention ponds. The process modifications include:

- n Installation of a larger oil-water separator (OWS) with a higher hydraulic retention time and more robust oil separation technology to treat the flow of process water generated from forge hammers and other miscellaneous forge processes.
- n Installation of an oil storage tank with secondary containment for temporary storage of oil collected from the new proposed OWS.
- Nater processed through the new proposed OWS will be pumped to CDF's existing water reclaim system for reuse as cooling water or as boiler feed water. Excess recycled water will be discharged to the Stark County Sanitary Sewer with ultimate drainage to the City of Massillon's Waste Water Treatment Plant (WWTP).
- Current non-contact cooling water overflows will be reused or diverted and pumped to CDF's boiler system.

Additionally, CDF will install best management practices (BMPs) for storm water flows to further minimize the potential for discharge of oil residuals to the on-site ponds during storm events. These BMPs include:

- Installation of three storm water-oil separators at three primary storm water pipelines prior to their discharge to CDF's on-site ponds.
- Installation of oil retention booms within the ponds at each outfall to capture any residual oils that may inadvertently reach the ponds.

Concurrent with these proposed facility modifications, CDF will conduct remediation at Ponds #1 and #2 to remove residual oils contained within pond sediment and surrounding soils. Once remediation activities are deemed complete, CDF will reconstruct these ponds with clay linings for future storm water retention, with storm water infiltration occurring only at Pond 3. Project plans and details are described in the accompanying Project Plans (Sheets 1 to 15; Attachment A) and manufacturer's equipment specifications (Attachment B).

CDF's project objectives include:

- n Significant improvement in process water and oil management operations.
- n Implementation of process water reuse to the maximum extent possible with excess process water diverted to the Stark County Sanitary Sewer System and City of Massillon WWTP.
- n Improvement of storm water management practices to minimize the inadvertent release of residual oils to on-site ponds.
- Once process water and storm water improvements are fully implemented, conduct pond remediation efforts to remove residuals from pond bottoms and side walls.

This Permit-to-Install (PTI) application describes the facility modifications that will be implemented to eliminate the discharge of process water to the on-site ponds and to improve the oil-water separation process so that the treated process water may either be reused or discharged to the City of Massillon's WWTP (via Stark County Sanitary Sewer System).

Section 2 Facility Description

The CDF property has been used for industrial purposes beginning with war-time manufacturing operations by the United States Army Air Corps in 1942. CDF officially acquired the rights to the property in 1951, and since that time, have successfully operated a steel and custom metal hammer forge at this facility. CDF currently employs approximately 400 workers. No metal is melted or poured at this facility.

Figure 2 illustrates the nearby land use in the vicinity of the CDF facility. CDF's property is bound by Norfolk Southern (NS) railroad property (3 rails) to the north, with a sand and gravel pit located to the north of the facility (north of the railroad tracks). Primarily commercial / industrial properties are located to the west, south, and east. There are some residential properties immediately south of the facility along Southway Street SW. Figure 2 also shows the locations of sanitary and storm sewer lines (on- and off-site), locations of CDF production wells, and locations of nearby roadways and major water courses.

2.1 Unit Operations

Facility operations are classified as Iron and Steel Forgings [1987 Standard Industrial Code (SIC) 3462, and 1997 North American Industry Classification System (NAICS) 332111]. CDF's forging operations/processes include:

- n Fourteen (14) steam-driven forge hammers
- n Ten (10) rotary furnaces (for heating steel prior to forging)
- n Four (4) box furnaces (for heating steel prior to forging)
- n Seven (7) heat treat furnaces (for heat treating finished forged products)
- n Three (3) quench operations (used in conjunction with heat treating furnaces)
- n Two (2) natural gas-fired (or fuel-oil fired) boilers and one (1) coal-fired boiler (for steam production used at the hammer forge operations)
- n Miscellaneous and ancillary forge operations including grinding, shot blasting, and machining

All water currently used in CDF operations is derived from the operation of two (2) on-site production wells. Current combined daily flow from the two wells is approximately 250,000 to 450,000 gallons per day (gpd) with the rate dependent upon facility production. Canton Drop Forge utilizes a 100,000-gallon on-site water tower tank for temporary water storage prior to

use. A facility Process Flow Diagram for current conditions is provided in Figure 3, and current condition flow rates for the various processes are summarized in Table 1 below.

Table 1
Current Processes and Flows

PROCESS FLOW STREAM	FLOW RANGE (GPD)	TYPICAL (GPD)
Production Well Flow	250,000 to 450,000	350,000
Steam Generation	100,000 to 200,000	150,000
Process (Contact) Flow	50,000 to 100,000	75,000
Non-Contact (Cooling) Flow (Make-up)	50,000 to 150,000	125,000
Sanitary Sewer Discharge	25,	000
Pond #2 Discharge	125,000 t	o 225,000

2.1.1 Steam-Driven Forge Hammers

Approximately 100,000 to 200,000 gpd are used to generate steam for forging operations (see Section 2.1.3). Steam condensate and non-combusted die lube and graphite are captured and currently drain by gravity at a design average rate of approximately 125 gallons per minute (gpm) to an oil-water separator (OWS) unit through one of two subsurface drainage pipes. Actual flows are typically in the range of 30 to 90 gpm. Occasionally, due to the intrusion of storm water through openings in the building sidewalls and roof, the flow has potential to increase to the hydraulic limit for the 6-inch diameter OWS inlet pipe (approximately 165 gpm). The existing OWS is equipped with dual sequencing effluent pumps that operate at a flow rate of approximately 190 gpm in solo mode and up to 255 gpm if operating together (under extreme high flow conditions).

Quench oil, used in heat treating finished parts, is contained within a closed loop piping system. This piping is routed to a water-filled outdoor heat exchanger. This heat exchanger (reservoir) is filled from CDF production wells. Currently, overflow from this non-contact cooling water reservoir is discharged by gravity within storm drains to Pond #2.

2.1.2 Furnaces

CDF operates a total of 21 furnaces and 3 quench operations for product heat treating before and after forging. A portion of the cooling water from these processes is captured with the steam hammer wastewater (see Section 2.1.1), while the remaining portion is captured and discharged to CDF's water reclaim system. Currently, a portion of the

reclaimed non-contact cooling water, typically in the range of 20 to 60 gpm, is discharged by gravity within storm drains to Pond #2.

2.1.3 Industrial Boilers for Steam Generation

CDF uses approximately 100,000 to 200,000 gallons of water per day to generate steam. Steam condensate and blowdown is recovered in CDF's water reclaim system (see Section 2.1.2).

2.2 Operations Schedule

Currently, CDF operates on a 4-days per week, 10-hours per day schedule in the forge shop. Facility production and subsequent water usage during each daily cycle varies. Depending on product demand, CDF has potential to operate 24 hours per day and 7 days per week.

2.3 Waste Stream Characterization

CDF currently operates an oil-water separator for the removal of die lube from facility wastewater. Following oil-water separation, process water is currently discharged to an on-site pond (Pond #2). Water from the bottom of Pond #2 is pumped to Pond #3 for evaporation and infiltration. A summary of analytical results from samples collected from Pond #2 are contained in Attachment C. Collected oil from the OWS is recycled at an off-site recycler facility.

Any residual oil not currently captured is discharged to Pond #2. Pond #2 is currently equipped with a rope-type oil skimmer unit for collection of floating oil. Process water and storm water underdrains to Pond #3 where it evaporates and infiltrates.

This Permit-to-Install (PTI) application describes facility modifications that will be implemented to eliminate the discharge of process water to the on-site storm water retention ponds and to improve the oil-water separation process so that the treated process water may either be reused within facility operations or be discharged to the City of Massillon's Wastewater Treatment Plant (via Stark County sewer system).

Section 3 Proposed Treatment Facilities

CDF will operate a closed loop water reuse system to the maximum extent possible (see Figure 4). Water quality and temperature of recyclable water will dictate whether this water will be returned for reuse in facility processes or whether a portion of the recyclable water will be discharged to the sanitary sewer. Additional process water makeup, to account for water lost as steam in the forging processes, will be obtained from two (2) on-site production well pumps. CDF intends to acquire water for sanitary uses from the City of Massillon.

Canton Drop Forge will install a replacement oil-water separator (OWS) to effectively remove floating and dispersed oil and suspended solids from its process wastewater. Separated oil will be pumped to an above-ground 4,000-gallon steel oil storage tank using a Price (SP-150AI) self-priming centrifugal pump. The tank will reside within a 4,000-gallon concrete secondary containment structure. CDF anticipates pumping oil from the storage tank on a monthly basis, or more frequently if necessary. Recovered oil will be hauled off-site for recycling and reuse by CDF.

Water processed through the OWS will be discharged to CDF's existing water reclaim/heat exchanger reservoir. This water will be pumped for use as non-contact cooling water using existing facility pumps. Excess water from CDF's water reclaim/heat exchanger reservoir that currently overflows to Pond #2 will be pumped to CDF's boiler system for steam generation. Alternatively, if the boiler system has no water demand, excess water will discharge to CDF's water storage tank. At high level conditions within the tank, excess water will be diverted to the sanitary sewer.

3.1 Hydraulic Loading

CDF's new OWS (PS International Model PSC-4000-SC-LS-DW-J; see Attachment B) is designed for 300 gallons per minute (maximum) and 160 gpm (average) of process flow based on design criteria defined in Section 3.4. The separator is equipped with parallel corrugated coalescing plates for primary oil separation, and with a polypropylene mesh filter for final polishing to achieve a targeted maximum 10 ppm of oil in the process effluent. CDF will minimize process water flow to the OWS to the maximum extent possible to increase the OWS retention time and improve the oil separation capability of the unit.

Parallel alternate-sequencing effluent pumps (Goulds 3SD52H4DA) contained within the oil-water separator wet well will discharge to the facility's reclaim water reservoir for reuse. The OWS discharge pumps will operate sequentially during each wet well fill cycle. At high level,

the pump designated as the lead pump will operate and discharge up to 190 gpm (approximately), and if necessary, the lag pump will operate concurrently to discharge up to 250 gpm (approximately) until a low level condition is reached in the wet well. Once high level is reached again, pumping operation will resume with the lag pump designated in the previous cycle as the lead pump during the current cycle. Pump sequencing will be utilized to balance the wear and tear on each pump.

OWS effluent pumps will be powered from a CDF-supplied power source. In the event that the power supply is interrupted, a to-be-installed natural gas-fired emergency electrical generator will operate to supply power to the pumps so that the discharge may be maintained continuously.

The OWS pumps will discharge to CDF's water reclaim/heat exchanger reservoir for reuse. Excess water will be pumped to CDF's boiler system for steam generation, to CDF's water tower storage tank for temporary storage and reuse, or if the tower is at high level conditions, excess water will be discharged to the facility's existing sanitary sewer outfall to the Stark County sanitary sewer system for treatment by the City of Massillon WWTP. Discharge rates will be in accordance with discharge limitations imposed by Stark County Sanitary Sewers and the City of Massillon WWTP. Based on preliminary discussions, Stark County has indicated that discharge flows up to 50 gpm from 6 AM to 12 AM, and flows up to 200 gpm from 12 AM to 6 AM (126,000 gpd) will be acceptable. Proposed process flow rates are provided in Table 2.

CDF will make all efforts to reduce water usage within facility operations to minimize sewer discharges to the maximum extent possible.

Table 2
Proposed Processes and Flows

PROCESS FLOW STREAM	FLOW RANGE (GPD)	TYPICAL (GPD)
Production Well Flow	100,000 to 326,000	225,000
Steam Generation	100,000 to 200,000	150,000
Process (Contact) Flow	50,000 to 100,000	75,000
Sanitary Sewer Discharge	0 to 126,000	75,000

3.2 Physical and Chemical Characteristics of Proposed Waste Stream

Process wastewater directed to the proposed OWS is derived primarily from hammer forge operations. Forge hammer operators spray water and manually apply die lube containing graphite during the forging process. Steam condensate and any non-combusted oil is discharged to the OWS. The OWS is designed to separate oil from water at flows up to 300 gpm to achieve a maximum effluent oil concentration of 10 ppm.

The OWS is also equipped with a primary grit chamber for the removal of coarse suspended solids. Additionally, a sludge baffle within the main chamber of the OWS will retain finer particulates not removed in the primary grit chamber. The intent of the OWS unit is to achieve water quality suitable for reuse within facility processes. Any excess water that cannot be reused will be diverted to the sanitary sewer.

3.3 Treatment Unit Specifications

A description of CDF's proposed treatment/reuse process is contained in Sheets 1 to 15 in Attachment A. The OWS, manufactured by PS International (Sioux Falls, SD) is designed for flows up to 300 gpm, and will remove oil to an effluent concentration of 10 ppm (or less). Shop drawings and an OWS Operations Manual supplied by PS International are included in Attachment B.

3.4 Design Criteria

The following criteria were used in the design process:

- Process (contact) water design flow rate is 125 gpm with maximum flow to 300 gpm. Typical flows will be 30 to 90 gpm; CDF will reduce water use to the extent possible to improve the oil separation process without jeopardizing production performance.
- n Die lubes used by CDF will gravity separate from water, as the specific gravity (SG) of the die lubes will be less than 1.0.
- No Sewer discharge rates (as proposed by Stark County) will be up to 50 gpm from 6 AM to 12 AM and up to 200 gpm from 12 AM to 6 AM. CDF's proposed sanitary sewer discharge pipeline will be equipped with a flow-control valve that will automatically modulate to restrict flow to the Stark County-approved flow limit throughout each daily cycle.
- No Water from the OWS and from non-contact cooling overflows will be reused to the extent possible within CDF processes.

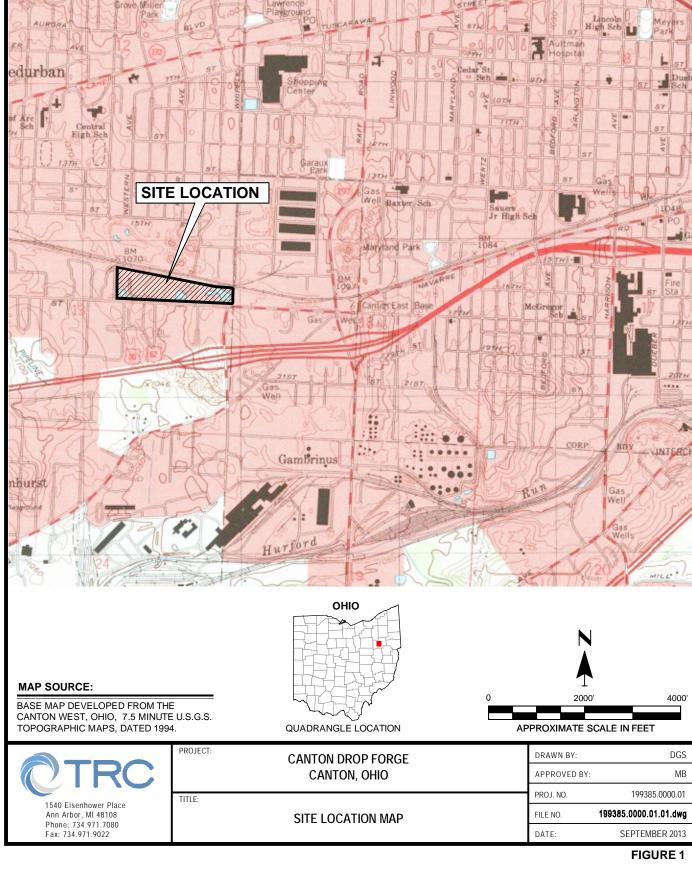
3.5 Residuals Disposal

Settled solids captured within the OWS grit chamber or within the separation chamber of the OWS will be removed by vacuum truck in accordance with the OWS operations manual, and hauled off-site for disposal in accordance with applicable regulations. The majority of these retained solids are expected to be fine graphite particles introduced with the die lube at the forge hammers. This graphite is non-hazardous.

Oil retained by the OWS will be pumped to a 4,000-gallon above-ground storage tank for temporary storage. This oil is derived from the introduction of die lube (release agent) during the forging process. The captured oil will be hauled off-site, as specified in the OWS operations manual, for recycling and reuse in accordance with applicable regulations.

Figures

PLOT DATA



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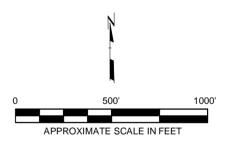


LEGEND

STARK COUNTY SANITARY SEWER STORM DRAINAGE AND SEWER



PRODUCTION WELL



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PROJECT:

CANTON DROP FORGE CANTON, OHIO

TITLE:

SURROUNDING AREA MAP

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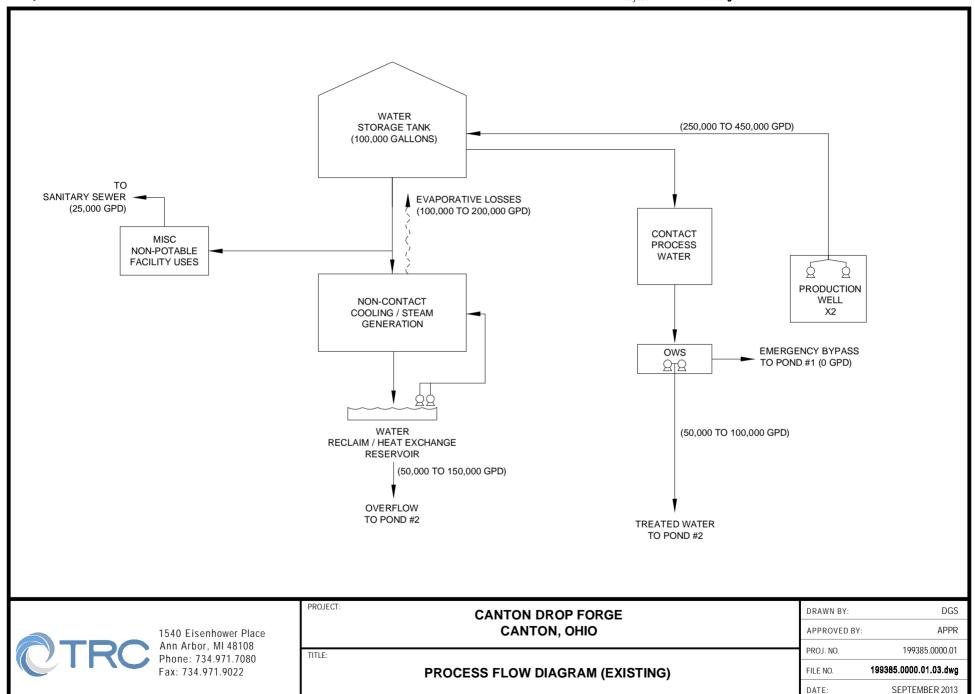
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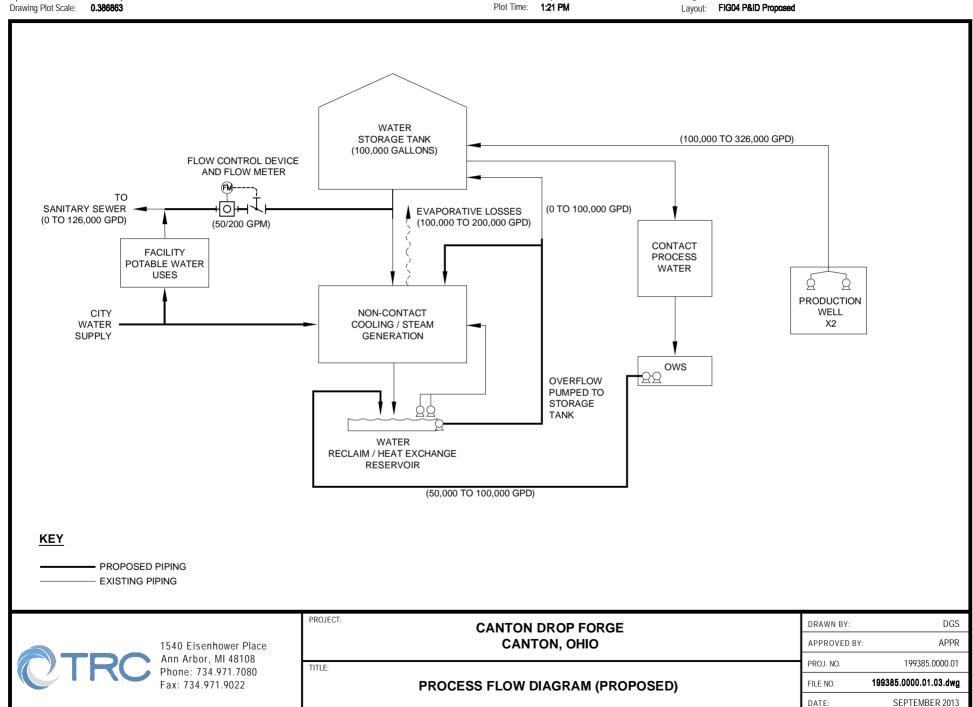
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Layout: FIG04 P&ID Proposed



Attachment A Project Plans

Canton Drop Forge Canton, Ohio

OIL-WATER SEPARATION IMPROVEMENTS PROCESS WATER DISCHARGE TO SANITARY SEWER & REUSE

PERMIT-TO-INSTALL / PLAN APPROVAL APPLICATION

PREPARED FOR:

Canton Drop Forge

Canton, Ohio

PREPARED BY:

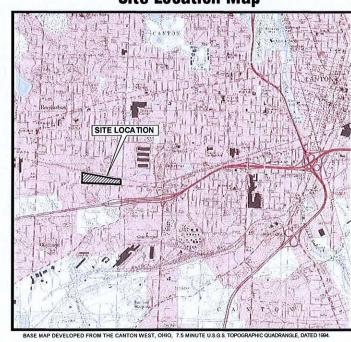
TRC Environmental Corporation

Ann Arbor, Michigan

September 2013 DATE:



Site Location Map



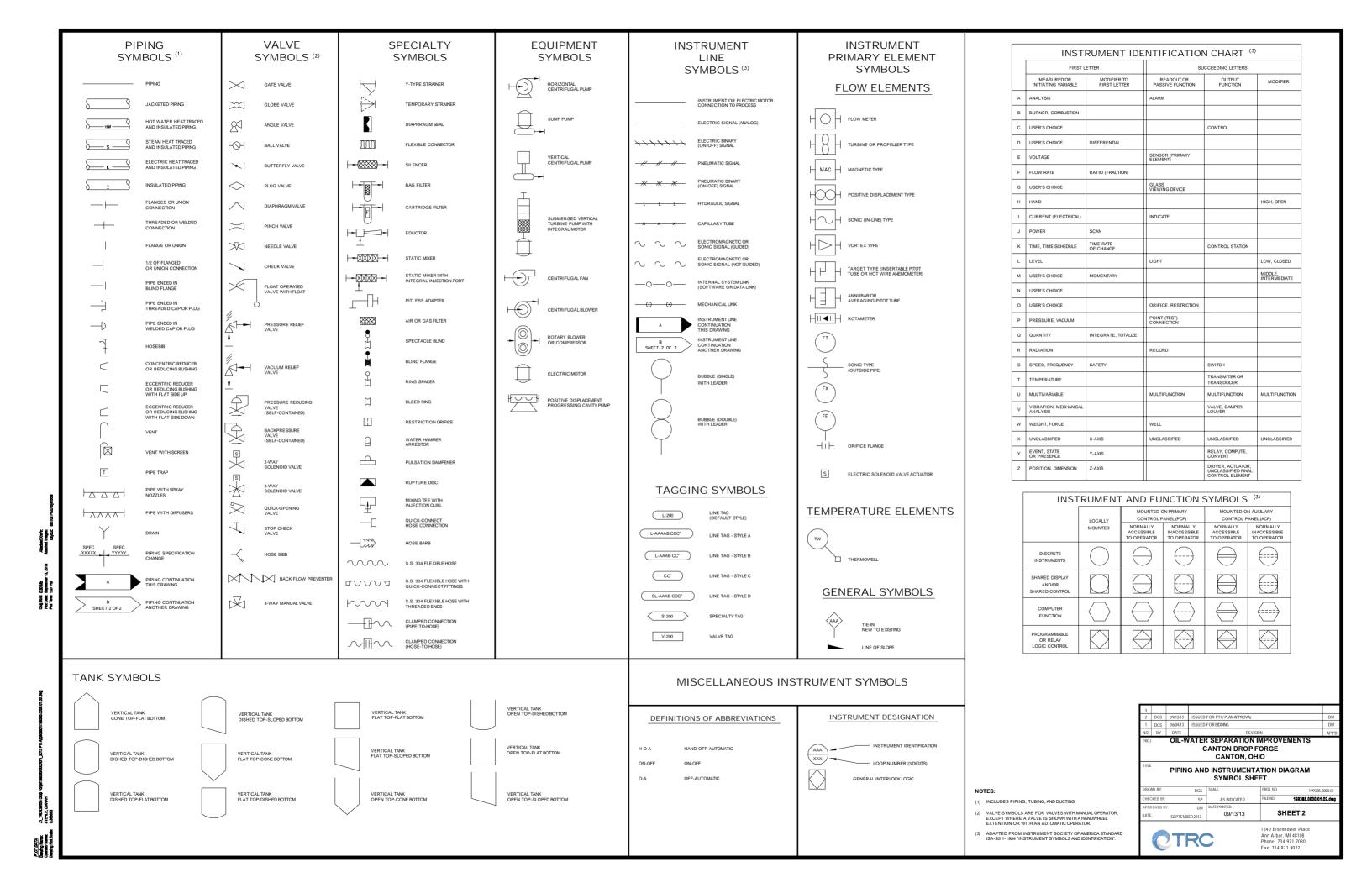
Drawing Index

SHEET NUMBER	SHEET TITLE
1	Title Sheet
2	Piping and Instrumentation Diagram Symbol Sheet
3	Existing Conditions Site Plan (West)
4	Existing Conditions Site Plan (East)
5	Proposed Site Plan (West)
5A	Proposed Site Plan (West) Expanded Scale
6	Proposed Site Plan (East)
7	Process & Instrumentation Diagram - Process Water
8	Process & Instrumentation Diagram - Stormwater
9	Oil-Stormwater Separator Details
10	Oil-Process Water Separator Details, Oil Storage Tank and Secondary Containment Details
11	SPCC Containment Area Details
12	Discharge Piping Plan & Profile
13	Civil / Mechanical Details
14	Electrical Power Plan (1 of 2)
15	Electrical Power Plan (2 of 2)





Ohio



OVERHEAD ELECTRIC ----- PROCESS LINE ----- PROCESS/STORM LINE

GAS LINE (OVERHEAD)

RAIL LINE

CATCH BASIN
MANHOLE
GUTTER
Ø UTILITY POLE

PRODUCTION
WELL

EXISTING
STORMWATER
TRANSFER PUMP

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CANTON DROP FORGE CANTON, OHIO

EXISTING CONDITIONS SITE PLAN (WEST)

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---- PROCESS LINE ----- PROCESS/STORM LINE

— 6AS — 6AS — GAS LINE (OVERHEAD) RAIL LINE

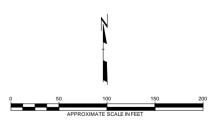
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Ø UTILITY POLE

PRODUCTION

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STORMWATER
TRANSFER PUMP

CATCH BASIN
MANHOLE

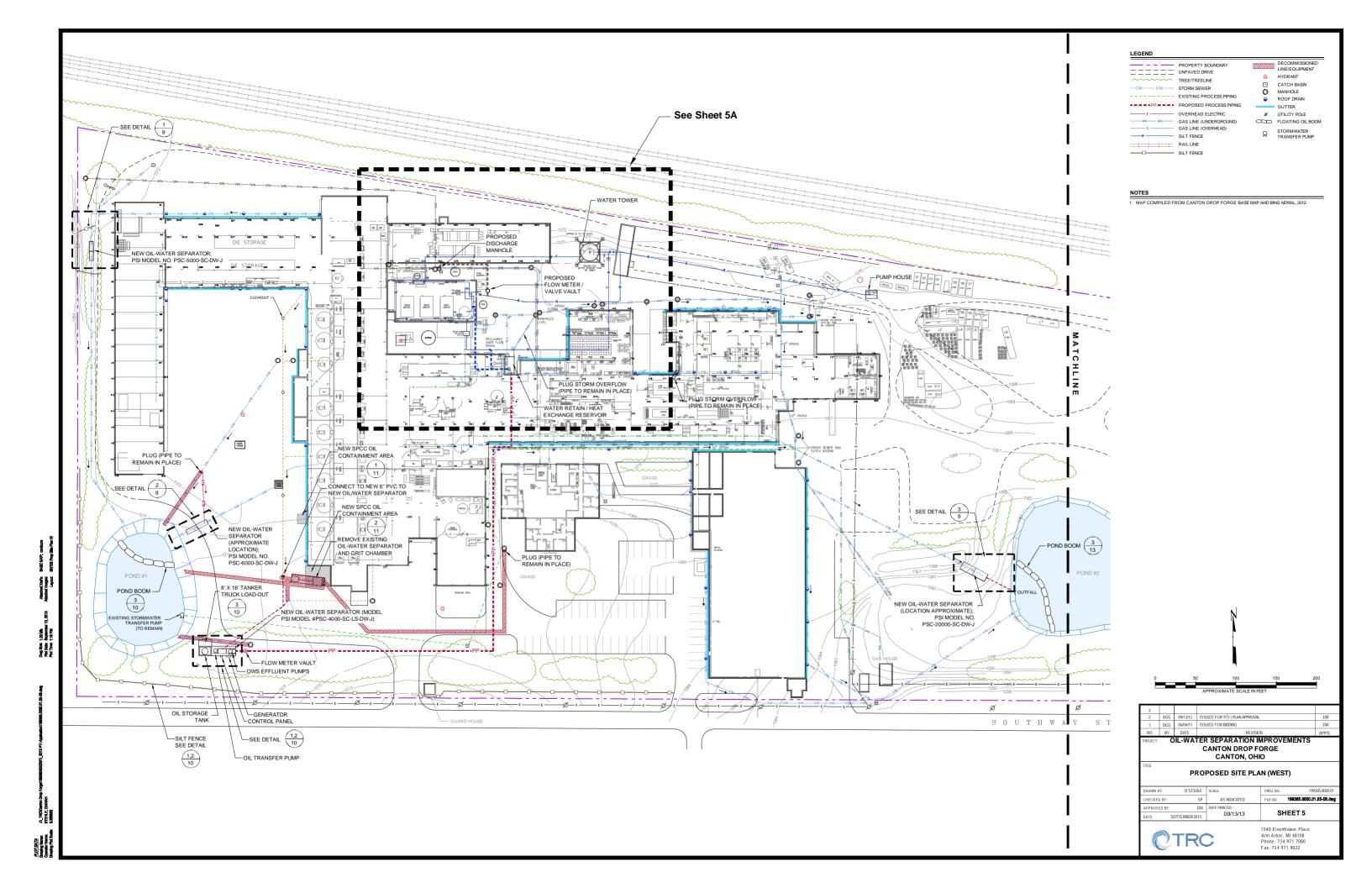


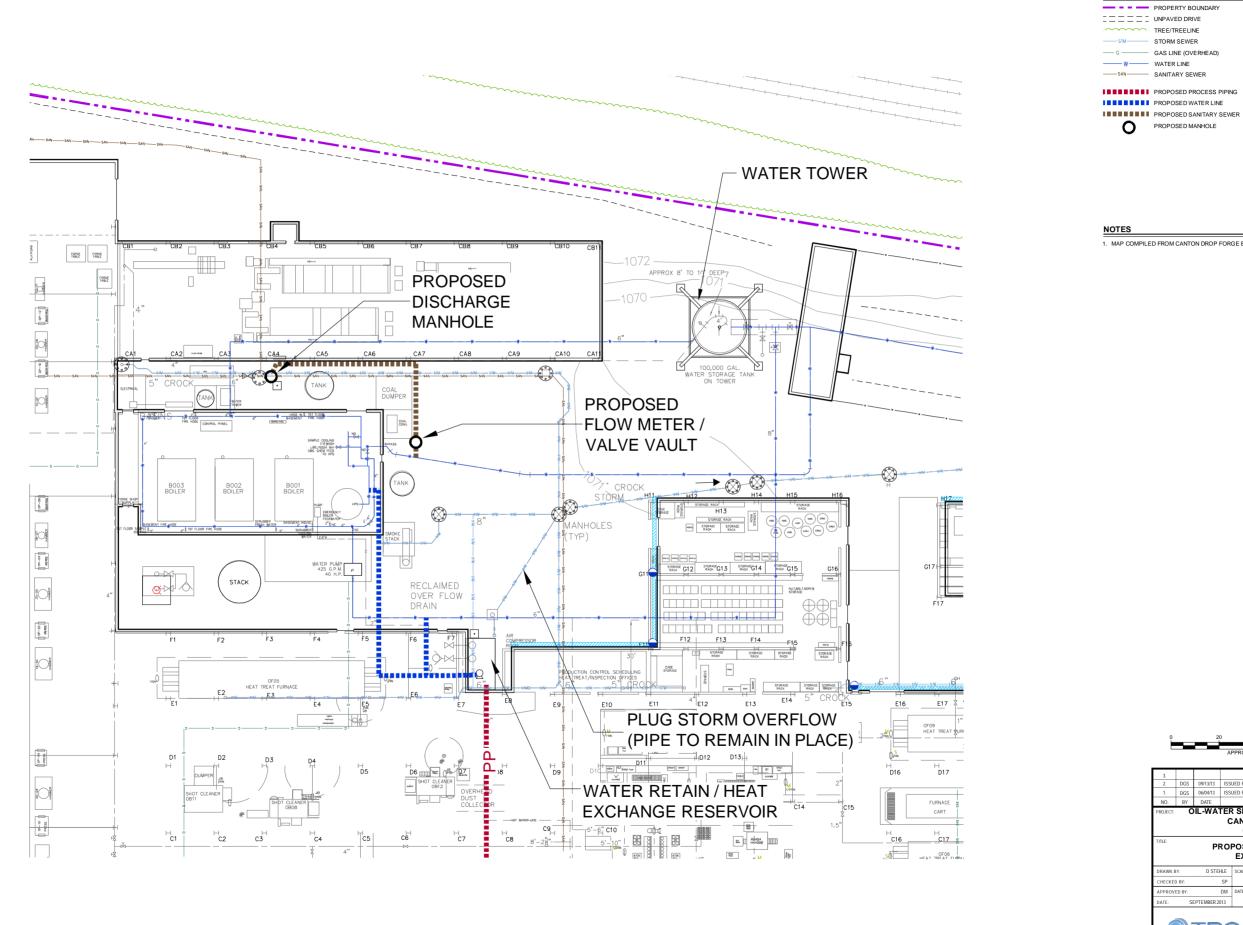
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CANTON, OHIO EXISTING CONDITIONS SITE PLAN (EAST)

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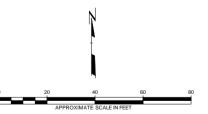
LEGEND

O HYDRANT

□ CATCH BASIN

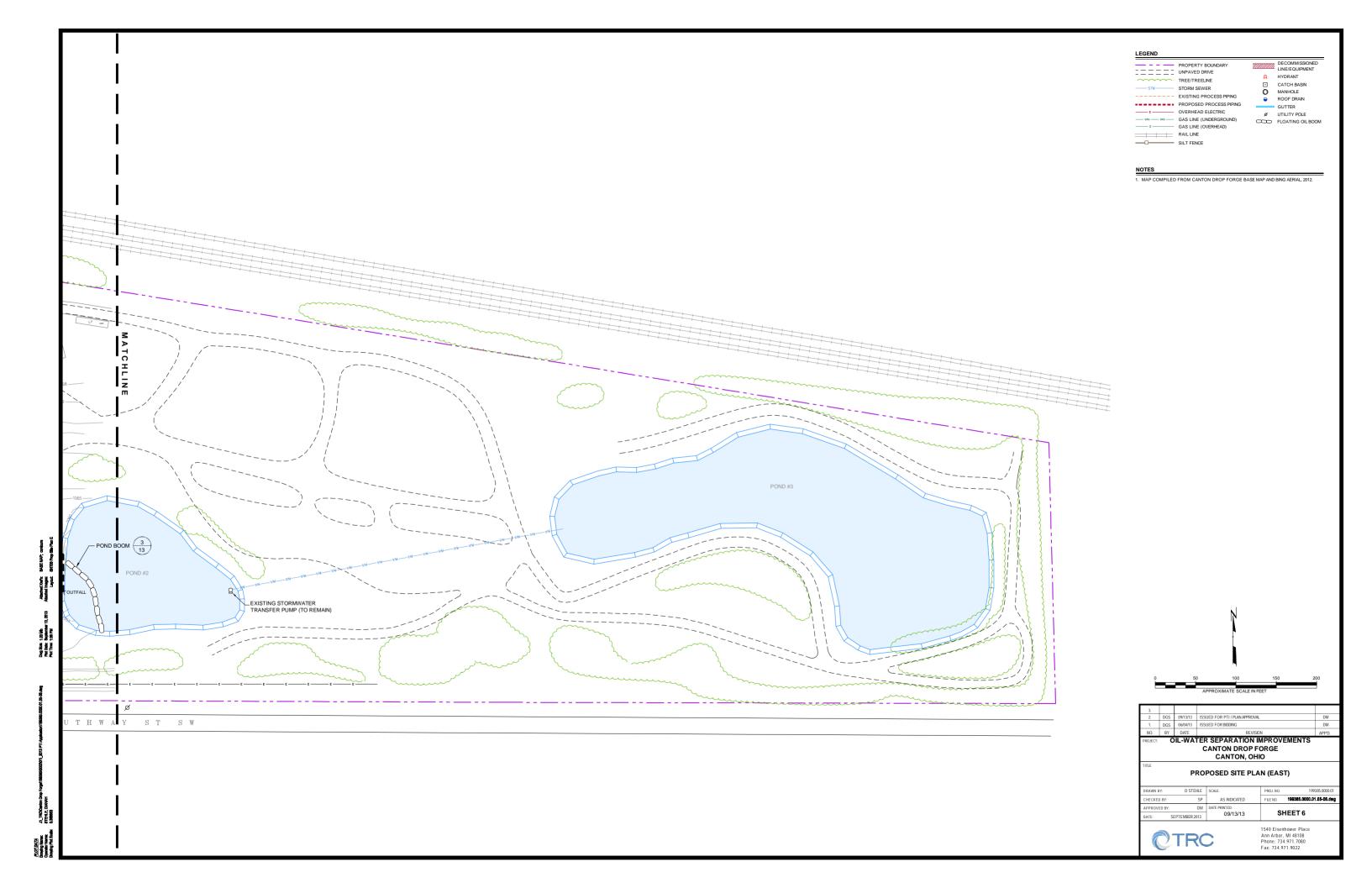
MANHOLE

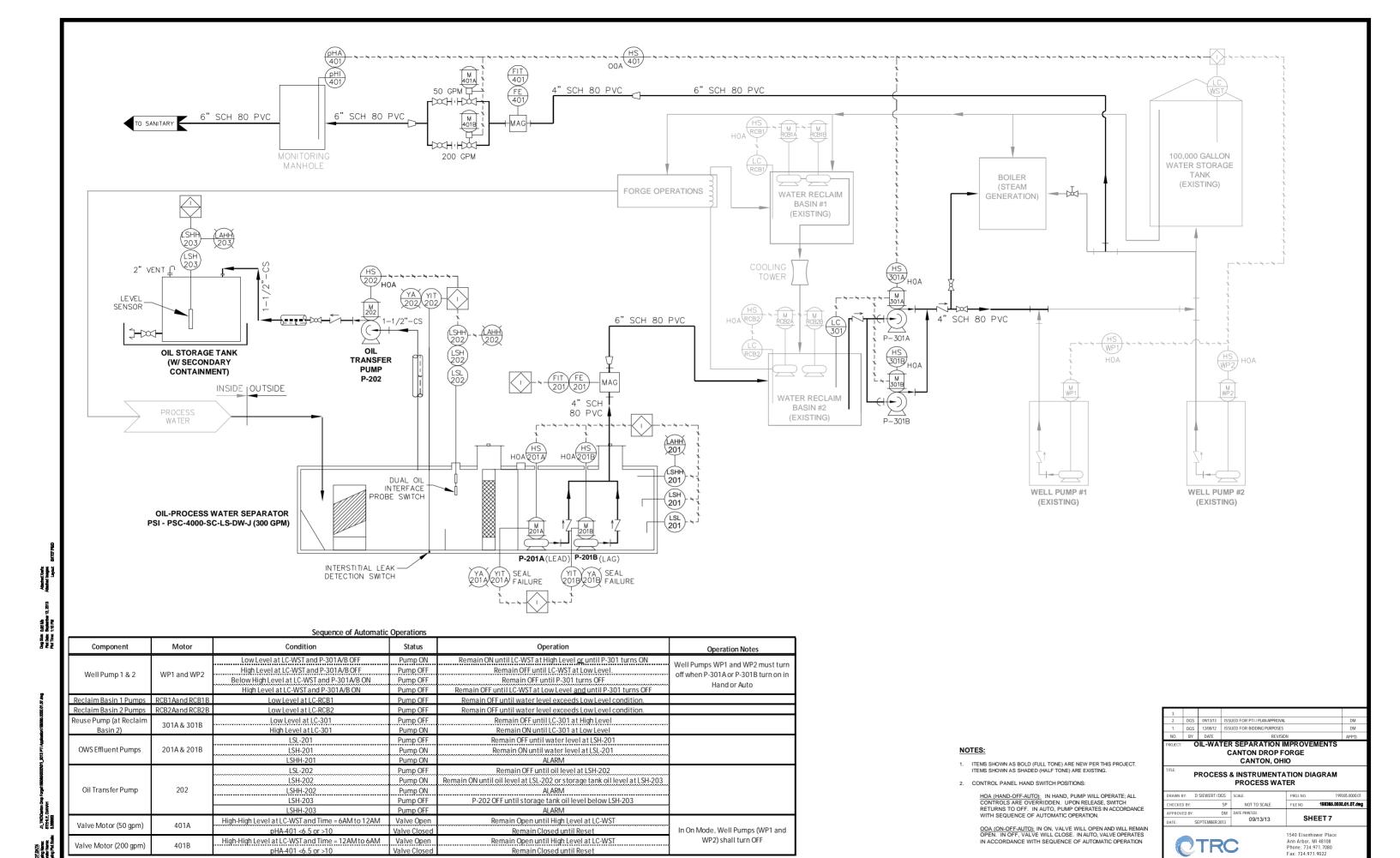
 ROOF DRAIN Ø UTILITY POLF Q TRANSFER PUMP



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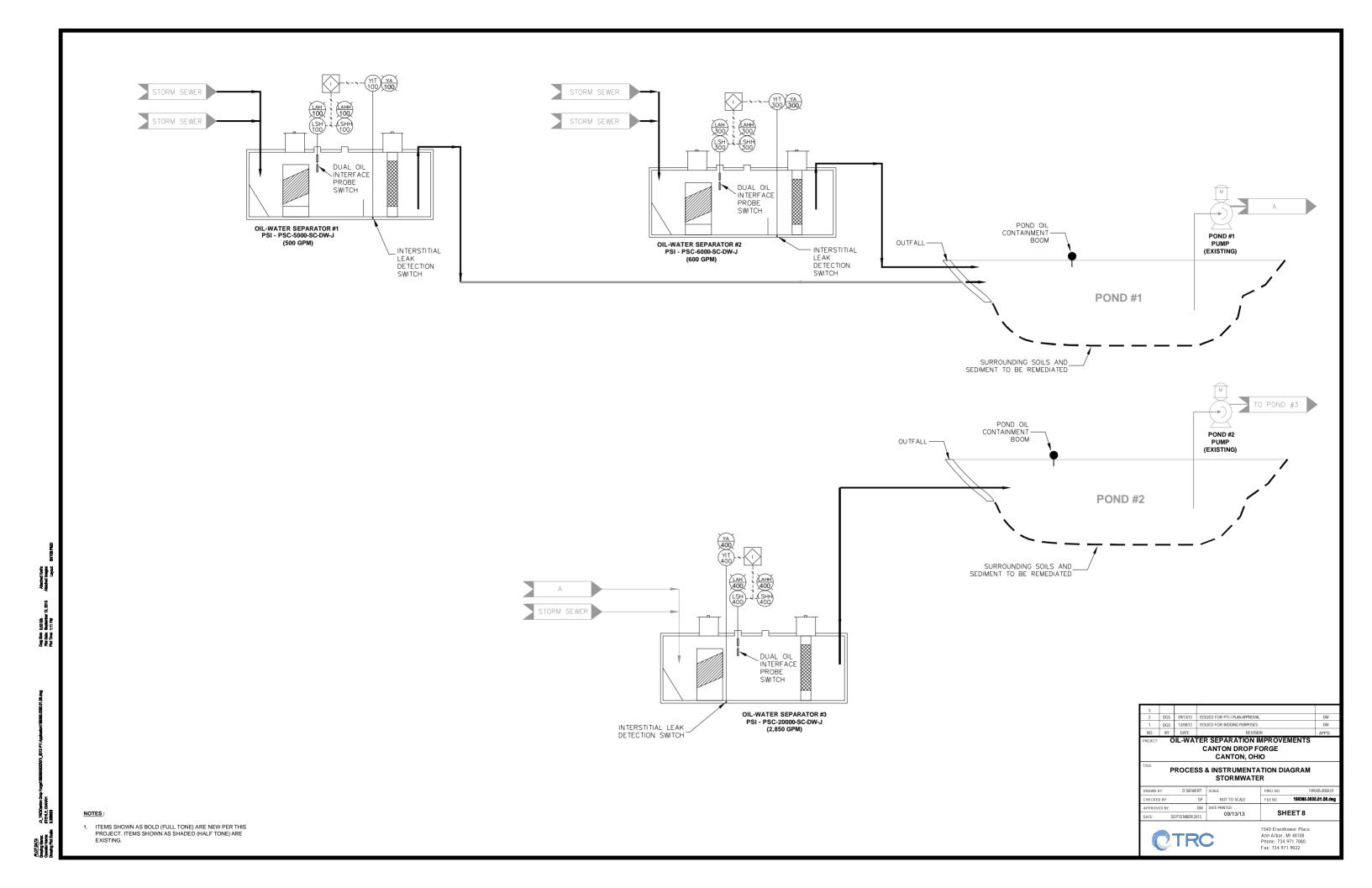


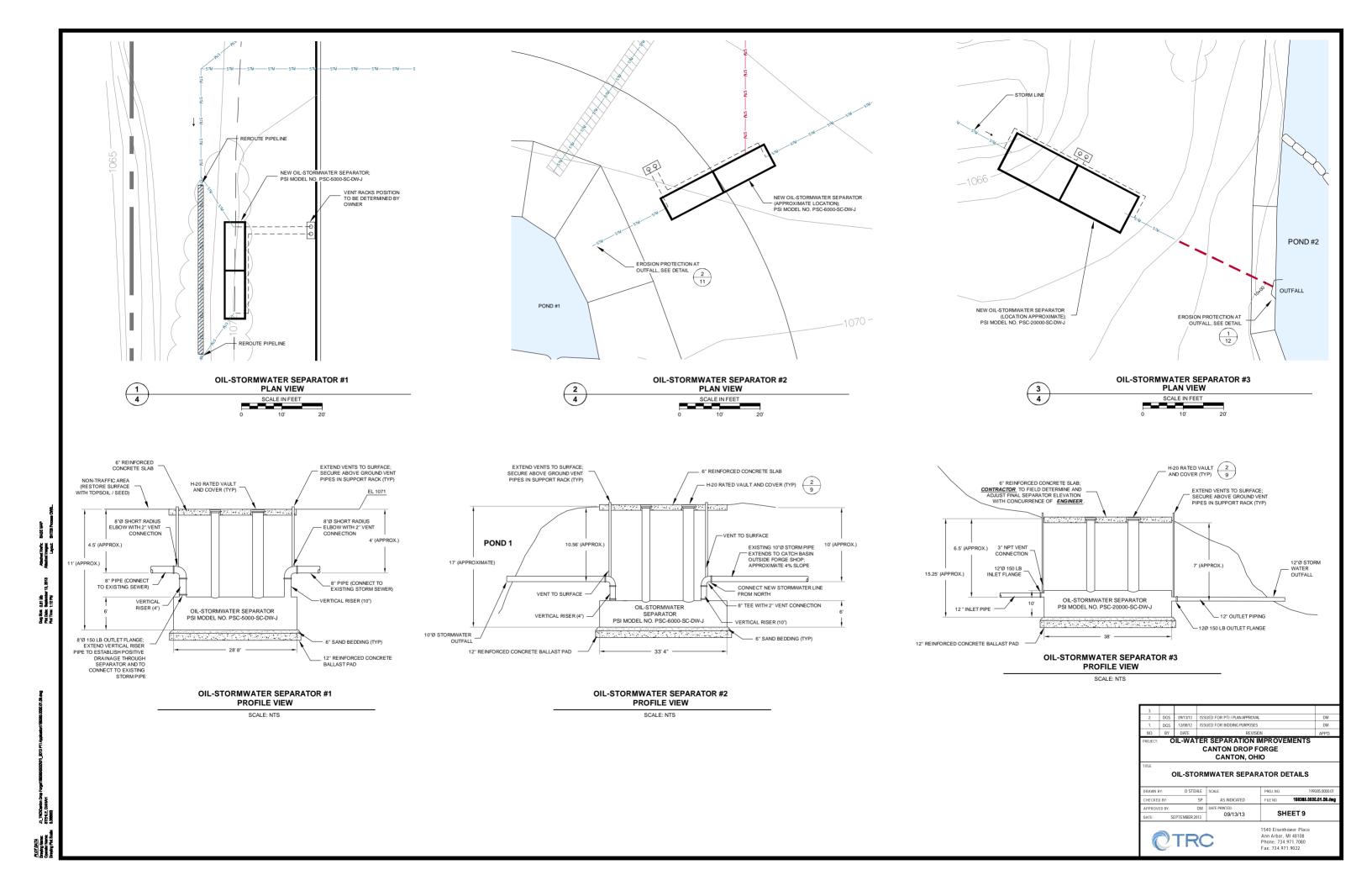




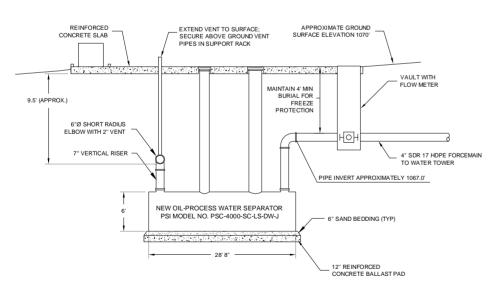
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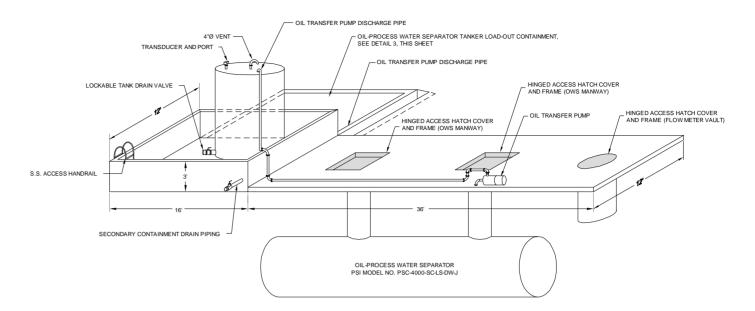




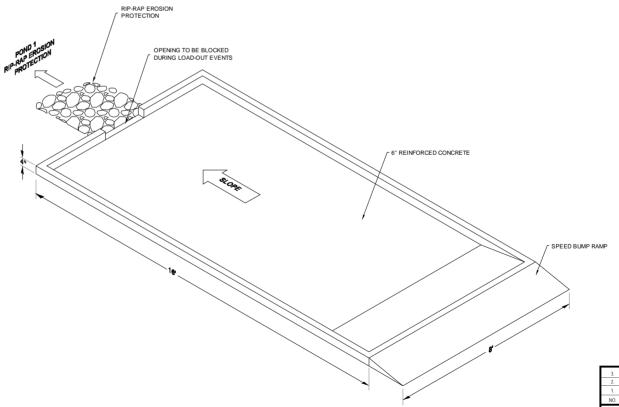


OIL-PROCESS WATER SEPARATOR #4 PROFILE VIEW

SCALE: NTS



OIL-PROCESS WATER SEPARATOR #4 LAYOUT



OIL-PROCESS WATER SEPARATOR
TANKER TRUCK LOAD-OUT CONTAINMENT



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OIL-PROCESS WATER SEPARATOR DETAILS, OIL STORAGE TANK AND SECONDARY CONTAINMENT DETAILS

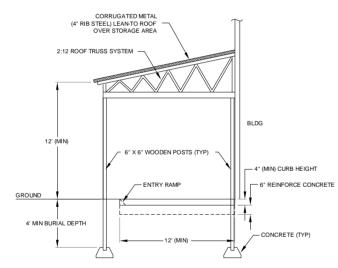
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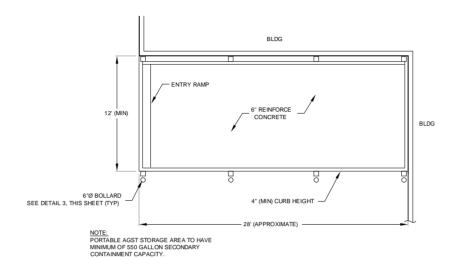
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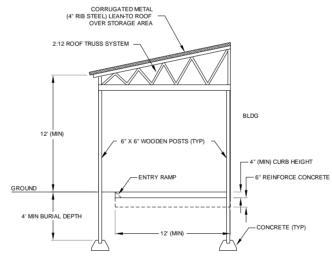
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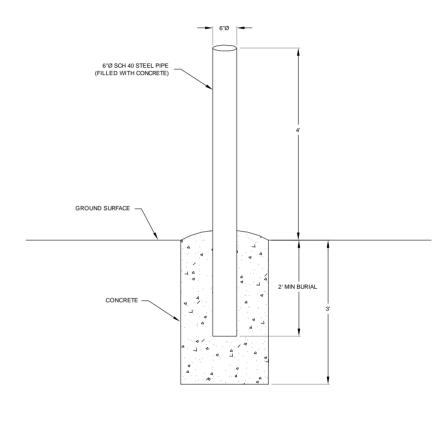




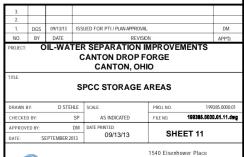


PORTABLE AGST STORAGE AREA

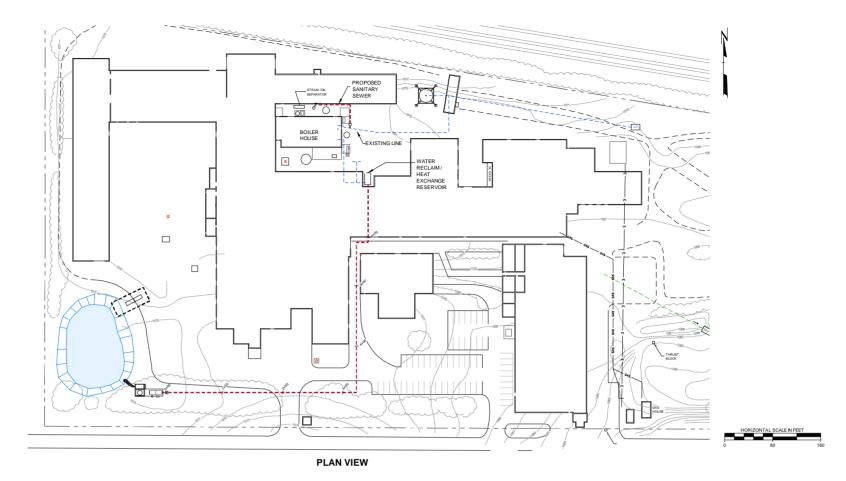
SCALE: NTS

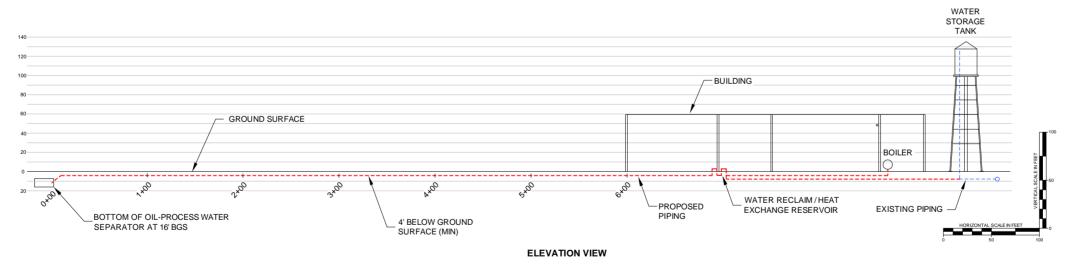












NOTE

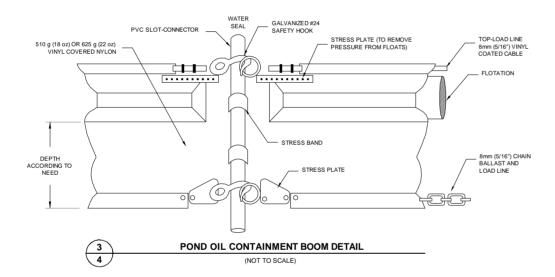
- MAP COMPILED FROM CANTON DROP FORGE BASE MAP AND BING AERIAL, 2012.
- 2. MAINTAIN MINIMUM OF 4' PIPE BURIAL DEPTH.
- 3. ADD REINFORCEMENT AT THE SURFACE WHERE NECESSARY FOR TRUCK TRAFFIC.
- LOCATIONS OF KNOWN UTILITIES ARE APPROXIMATE.
 CONTRACTOR IS RESPONSIBLE FOR CLEARING ALL UTILITIES
 PRIOR TO THE START OF ANY EXCAVATION ACTIVITIES.

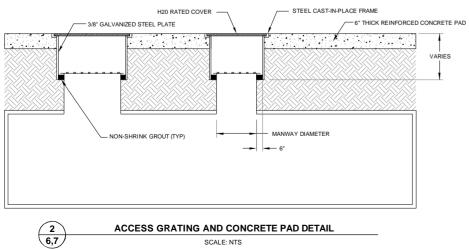
3.						
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1.	DGS 12/08/12 ISSUED FOR BIDDING PURPOSES DM					
NO.	BY	DATE	REVISION	APP'D.		
PROJECT:		VIL-VVA	TER SEPARATION IMPROVEMENTS CANTON DROP FORGE CANTON, OHIO			
DISCHARGE PIPING PLAN & PROFILE						

DRAWN BY:	D STEHLE	SCALE:	PROJ. NO.	199385.0000.01
CHECKED BY:	SP	AS INDICATED	FILE NO.	199385.0000.01.12.dwg
APPROVED BY:	DM	DATE PRINTED:	0111	-FT 40
DATE:	SEPTEMBER 2013	09/13/13	SHE	ET 12

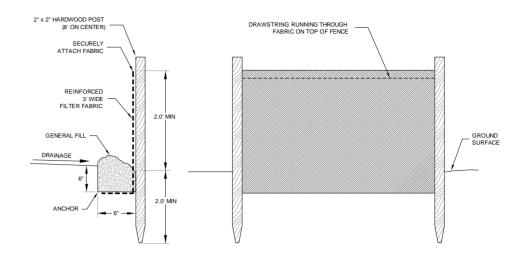


HDPE PIPE TRENCH DETAIL (TYPICAL) SCALE: 1" = 1'





ACCESS GRATING AND CONCRETE PAD DETAIL SCALE: NTS





NOTES:

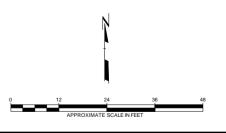
- FENCE POSTS SHALL BE PLACED 8 FEET CENTER-TO- CENTER OR CLOSER. THEY SHALL
 EXTEND AT LEAST 2 FEET INTO THE GROUND AND EXTEND AT LEAST 2 FEET ABOVE THE
 GROUND. POSTS SHALL BE CONSTRUCTED OF HARD WOOD WITH A MINIMUM DIAMETER THICKNESS OF 1 ½ INCHES.
- A METAL FENCE WITH 6 INCH OR SMALLER OPENINGS AND AT LEAST 2 FEET HIGH MAY BE
 UTILIZED, FASTENED TO FENCE POSTS, TO PROVIDE REINFORCEMENT AND SUPPORT TO THE
 GEOTEXTHIE FABRIC WHERE SPACE FOR OTHER PRACTICES IS LIMITED AND HEAVY SEDIMENT
 LOADING IS EXPECTED.
- 3. A GEOTEXTILE FABRIC RECOMMENDED FOR SUCH USE BY THE MANUFACTURER, SHALL BE BURIED AT LEAST 5 INCHES DEEP IN THE GROUND. THE FABRIC SHALL EXTEND AT LEAST 2 FEET ABOVET THE GROUND. THE FABRIC MUST BE SECURELY FASTENED TO THE POSTS USING A SYSTEM CONSISTING OF METAL FASTENERS (MAILS OR STAPLES) AND A HIGH STRENGTH REINFORCEMENT MATERIAL (NYLON WEBBING, GROMMETS, WASHERS, ETC.) PLACED BETWEEN THE FASTENER AND THE GEOTEXTILE FABRIC. THE FASTENING SYSTEM SHALL RESIST TEARING AWAYFROM THE POST. THE FABRIC SHALL INCORPORATE A DRAWSTRING IN THE TOP PORTION OF THE FENCE FOR ADDED STRENGTH.
- 4. INSTALL SILT FENCE AT LOCATIONS AS DIRECTED BY ENGINEER.
- 5. INSPECT THE SILT FENCE PERIODICALLY AND AFTER EACH STORMEVENT.
- IF FENCE FABRIC TEARS, STARTS TO DECOMPOSE, OR IN ANY WAYIS DAMAGED, REPLACE THE AFFECTED PORTION IMMEDIATELY.
- REMOVE DEPOSITED SEDIMENT WHEN IT REACHES 33% HEIGHT POINT OR IS CAUSING THE FABRIC TO BULGE.
- 8. TAKE CARE TO AVOID UNDERMINING THE FENCE DURING CLEAN OUT.
- 9. AFTER THE CONTRIBUTING DAMAGE AREA HAS BEEN STABILIZED, REMOVE SEDIMENT DEPOSITS, BRING THE DISTURBED AREA TO GRADE, STABILIZE.
- 10. SILT FENCE WILL REMAIN IN PLACE UNTIL VEGETATION IS ESTABLISHED.



Dyg State 0.50 Mb Flot Date: September Flot Time: 1:13 PM

Electrical Notes

- 1. NEW ELECTRICAL SERVICE FOR THIS OIL-WATER SEPARATION IMPROVEMENT SYSTEM IS 480V/3 PHASE/60 Hz, 30 AMP, 3-WIRE SERVICE. ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL ELECTRICAL EQUIPMENT NEEDED TO CONNECT TO COP'S EXISTING 480 VOLT ELECTRICAL SERVICE DISTRIBUTION EQUIPMENT, PROVIDE NEW 30 AMP FEEDER BREAKER AT MAIN ELECTRICAL SWITCHGEAR. MATCH EXISTING ALC FAULT CURRENT RATING. ELECTRICAL CONTRACTOR SHALL COOPRIDNATE WITH LOCAL UTILITY AUTHORITY, ALL NECESSARY NEC CODE REQUIREMENTS, AND ALL APPLICABLE LOCAL AND STATE CODE REQUIREMENTS ASSOCIATED WITH THE INSTALLATION OF THIS ELECTRICAL SYSTEM. BIDDING ELECTRICAL CONTRACTORS SHALL VISIT THE SITE AND FAMILIARIZE THEMSELVES WITH THE LOCATIONS OF ALL EQUIPMENT ASSOCIATED WITH THE STATE AND FAMILIARIZE THEMSELVES WITH THE LOCATIONS OF ALL EQUIPMENT ASSOCIATED WITH THIS CONTRACT.
- 2. ELECTRICAL CONTRACTOR WILL PROVIDE ALL ELECTRICAL WORK FOR THIS SYSTEM AS SHOWN. THIS WILL INCLUDE ALL LABOR AND MATERIALS ASSOCIATED FOR THE INSTALLATION OF PRIMARY 30 AMP FEEDER, SAFETY DISCONNECT, CONTROL PANEL (INSTALLATION AND CONNECTIONS ONLY), ALL MOTORS, SENSORS, PRESSURE SWITCHES AND LEVEL SWITCHES AS SHOWN ON THIS DRAWING AND ON DRAWING PO1, ALSO TO DE INCLUDED IS THE PROCUREMENT OF ALL ELECTRICAL EQUIPMENT AS SHOWN ON THIS SHEET (EXCEPT MAIN CONTROL PANEL), AND AS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING ELECTRICAL SYSTEM FOR THIS OIL-WATER SEPARATION IMPROVEMENT SYSTEM. COORDINATE WITH GENERAL CONTRACTOR FOR TRENCHING CONDUTYS, ETC.
- 3. PROVIDE MAIN SAFETY DISCONNECT SWITCH AS NEEDED PER CODE. MOUNT TO A WHITE PAINTED 3/4" PLYWOOD BOARD NEAR CONTROL PANEL.
- 4. TIE INTO EXISTING FACILITY GROUND SYSTEM PER NEC CODE. ROUTE GROUND WIRE TO ALL DEVICES WITHIN THIS ELECTRICAL SYSTEM, AS WELL AS ALL 480 VOLT EQUIPMENT, CONTROL PANEL, PUMPS, AND ALL OTHER DEVICES WHERE A GROUNDING TERMINAL IS AVAILABLE.
- 5. SIZE EQUIPMENT FOR AVAILABLE FAULT CURRENT (AIC). ELECTRICAL SUBCONTRACTOR TO VERIFY WITH LOCAL UTILITIES.
- ALL POWER CONDUCTORS SHALL BE SIZED AS SHOWN, USING 90°C INSULATION RATING WHERE NOTED.
- ALL WIRING SHALL BE IN HDPE CONDUIT UNLESS OTHERWISE REQUIRED BY STATE & LOCAL CODE. POWER & SIGNAL (I/O) WIRING TO BE ROUTED IN SEPARATE CONDUITS.
- 8 NOTIFY ENGINEER OF EXCEPTIONS TO ELECTRICAL PLANS PRIOR TO START OF INSTALLATION.
- T-STAT (J-LEAD) WIRING INSIDE OF MOTORS (IF PROVIDED BY MANUFACTURER) SHALL BE ROUTED TO CONTROL PANEL AND TERMINATED AS REQUIRED. CONTROL PANEL SHALL HAVE PROVISIONS FOR THIS MOTOR THERMAL PROTECTION. THIS THERMAL PROTECTION SHALL BE IN SERIES WITH MOTOR STARTER OVERLOAD THERMALS).
- 10. MAIN CONTROL PANEL IN THIS BUILDING IS PROVIDED BY UNION PACIFIC RAILROAD, AND INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
- 11. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH CONTROL PANEL DEVELOPER, FOR THE CONNECTION OF ALL INSTRUMENT WINNIG CIRCUITS ON THIS PROJECT SHALL INSTRUMENT ORICUITS ON THIS PROJECT SHALL BE 24V DC.
- 12. PANEL BUILDER SHALL PROVIDE FOR THE DESIGN AND CONSTRUCTION OF A COMPLETE AND FUNCTIONING CONTROL PANEL FOR THIS SYSTEM. PANEL BUILDER SHALL INCLUDE THE NECESSARY MAIN BREAKER, PLC, MOTOR PROTECTION SWITCHES, MOTOR STARTERS WITH THERMAL PROTECTION FOR CONTROLLED EQUIPMENT, CONTROL POWER TRANSFORMER, DC POWER, SELECTOR SWITCHES, AND EQUIPMENT ONOFF/ALARM INDICATION (GREEN/RED / AMBER) OR PER CLIENTS REQUIREMENTS.
- 13. PROVIDE CATALOG CUT SHEETS ON ALL CONTROL PANEL EQUIPMENT DURING THE SUBMITTAL PHASE OF THIS PROJECT.
- 14. CONNECT BACK-UP GENERATOR WIRING AND CONTROL PANEL WIRING TO GENERATOR AUTO-SWITCH. 30 FEEDER WIRING SIZE SHOWN ON THIS SHEET IS FOR 500 FOOT OR LESS WIRING LENGTH. WIRE SIZE MAY CHANGE IF DISTANCE TO PLANT ELECTRICAL IS MORE THAN 500 FEET.



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	T	F	20	

1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734.971.7080 Fax: 734.971.9022

SHEET 14

Attachment B Manufacturer's Equipment Specifications

SPECIFICATIONS

Model: PSC-4000-SC-LS-DW-J

Volume: 6,060 Gallons Total

Sludge Compartment: 990 Gallons Lift Station: 1,050 Gallons Separator: 4,020 Gallons

Flow Rate: 0 to 300 gpm Gravity Flow Oil Storage: 2,000 Gallons Maximum

Performance: 10 PPM or Less Free Oil

Construction: 1/4" ASTM A-36 Carbon Inner Vessel, Interstitial Stand-Off,

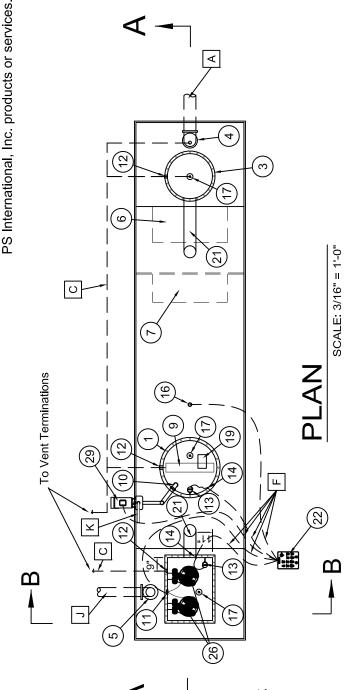
and Exterior Fiberglass Wall Per UL-1746 Interior Coating: None

Exterior Coating: Fiberglass

per UL-1746, İncludes 30 Year Warranty Separator Weight: ~12,000 lbs.

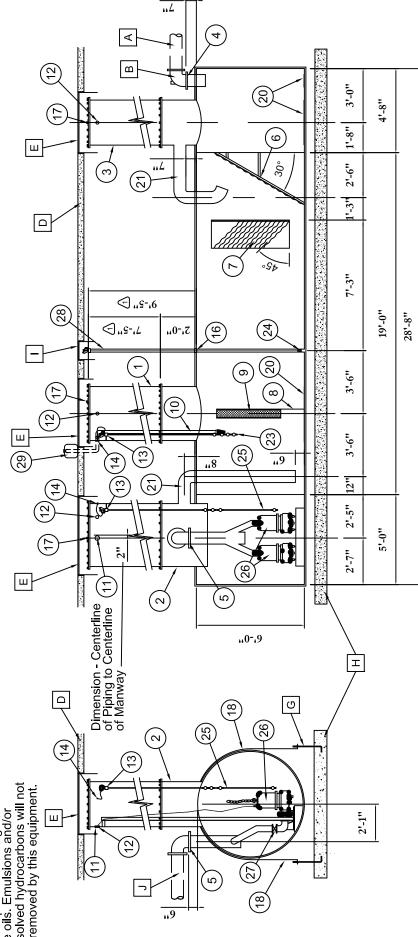
Max. Burial Depth: 17'-0" Grade to Top of Tank

- Vents must be terminated per local codes and for safety requirements
- Separator must be filled with clean water prior to being put into service. Ö
- က





This separator is designed to remove free oils. Emulsions and/or dissolved hydrocarbons will not be removed by this equipment.



PSI Furnished Equipment

information and must only be used for the installation, fabrication or promotion of

This drawing contains confidential

- 36" I.D. Access Manway for Separator (41" O.D. of Manway Flange)
 32" x 42" I.D. Access Manway for Lift Station (37" x 47" O.D. of Manway Flange)
 30" I.D. Access Manway for Sludge Compartment (35" O.D. of Manway Flange)
 - 6" 150 lb. Flat Faced Flanged Inlet 8" 150 lb. Flat Faced Flanged Outlet from Pumps

 \bigcirc

- 10 Gauge Corrugated Parallel Plate Separator 10 Gauge Corugated Plate Separator

 - 18" High Sludge Baffle
- Polypropylene Media Final Polishing Coalescer in Stainless Steel Frame 2" NPT Full Coupling with Internal Oil Suction Piping with Foot Valve
 - 3" NPT Full Coupling for Pump Conduit Connectior
 - 2" NPT Half Coupling for Vent Connections 2" Half-Coupling for Level Sensor Installation

 - 1/2" NPT Full Coupling For Sensor Conduit
 - Two (2) Lifting Lugs (Not Shown)
- 2" NPT Half Coupling with Schedule 40 Interstitial Monitoring Pipe 4" NPT Half-Coupling with Plug for Quick Inspection and Gauging Three (3) Epoxy Coated Steel Hold Down Straps

 - Stainless Steel Identification Plate
 - 1/4" Steel Striker Plate
- Crossover Pipe
- NEMA 4X Control Panel A3P3
- Stainless Steel Four Level Sensor with XP Junction Box Separator Section PSI Model PSLP-1-25 Leak Detection Probe with XP Junction Box
- Stainless Steel Four Level Sensor with XP Junction Box Lift Station Section
- Two (2) Goulds Model 3SD52H4DA Submersible Effluent Pumps with 3 HP, 1750 RPM, 460/3/60 Motors Each to provide 160 GPM @ 25' TDH. Pumps Include
 - Guide Rail System and Stainless Steel Lifting Chain for Easy Pump Removal and Installation from Grade. Motor Includes 20' of Submersible Power Cable
 - Two (2) 4" Check Valves One for Each Pump Discharge Line
- Price Model SP-150Al Self Priming, Centrifugal Pump with 1.5 hp, 460/3/60 XP Motor 2" Pipe 6'-0" Long with Threaded Ends and 2" Coupling on One End 27 28 29

Equipment Furnished By Others

- 6" Inlet Piping 6" Short Radius
- Short Radius Elbow (or TEE) with 2" Vent Connection
- 2" Diameter Vent Piping Concrete, Asphalt, Gravel or Other Grade Material Traffic Rated Manway Enclosure Covers (If Required)
- Conduit and Wiring Between Level Sensors, Leak Probe, Pumps and Panel A B O O B F O T F A A
 - Six (6) 1" Threaded Anchor Bolts
- Concrete Ballast Pad
- Curb Box for Access to Interstitial Space
 - 8" Piping from Pump Discharge \bigcirc
- 1-1/2" or Larger Oil Pump Discharge Piping Including Check and Isolation Valves

NUMBER	NUMBER DATE	REVISIONS: B'	ВУ
1	7-19-13	Per Engineering Review	BJS
PSI Qu	ote No.	PSI Quote No. Project: Oil-Water Separator	
2266	32EE 4042 🗆	Canton Drop Forge Canton, OH	
-0070	U-7 O	Sold To: Canton Drop Forge	
PSI Sales	sales	4575 Southway Street, SW	
Orde	Order No.	Canton, OH 44/06	

1305-	1305-1160	I SA C	PS International, Inc.
Customer	mer	5309 E Sioux F	5309 East Ryan Place Sioux Falls, S.D. 57110
	≻ ∵) # ud 🗡	Ph.#: (605) 332-1885
13-1727	727	Fax#: (Fax#: (605 332-1293
Drawn:	Date:	Checked By:	Drawing No.
BJS	5-30-13	BJS	PSC-4000-SC-LS-DW-J-00

Drawing No.	PSC-4000-SC-LS-D
Checked By:	BJS
Date:	5-30-13
Drawn:	BJS

SCALE: 3/16" = 1'-0"

Y-Y

B-B

SECTION

SCALE: 3/16" = 1'-0

PROJECT

Canton Drop Forge 4575 Southway Street, SW Canton, OH 44706

PSI SEPARATOR MODEL PSC-4000-SC-LS-DW-J

Separator includes exterior UL-1746 listed fiberglass corrosion protection system. Accessories include an automatic duplex water pump-out system with back-up high water alarm, an automatic oil pump-out system with back-up high oil alarm, leak detection alarm system and high oil storage tank alarm and high-high oil storage tank alarm with oil pump interrupt relay.

SALES ORDER NO. 1305-1160



5309 East Ryan Place Sioux Falls, SD 57110 Phone: 605-332-1885

Fax: 605-332-1293

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I. WARNINGS

- A. Oil-water separators are flow through process vessels designed to remove free oils and grease. Separated product may be hazardous and flammable! Extreme care must be used when servicing.
- B. Personnel servicing equipment must follow proper safety requirements including but not limited to the use of protective clothing, approved breathing equipment, exterior safety personnel and other safety measures as may be required to meet confined space entry permits.
- C. The separator must be properly vented by purchaser in accordance with governing safety codes for exit of combustible gases with respect to the environment. This may include the use of flame arresters in some areas. Check with local plumbing codes, NFPA 30 and/or other governing requirements.

D. Electrical Accessories

- 1. The separator must be grounded by purchaser as may be required by governing electrical codes.
- 2. Purchaser must ensure that the final state of all wiring is in accordance with the U.S. NEC and local codes for the service intended.
- 3. Electrical connections, non submersible electric motors and wiring must be appropriately protected from submergence and water infiltration. Intrinsically safe sensors and explosion proof pump motors must use wiring, conduit and connections necessary to maintain intrinsic safety. Conduit must be grounded at the control panel.

II. INSTALLATION

A. General

- 1. Quality control measures are taken in the factory to ensure the oilwater separator is free from defects at the time of shipment. These procedures include a factory air test at 5 psig in accordance with UL-58, a holiday test of the exterior PERMATANK fiberglass coating ensuring the vessel is pinhole free.
- 2. The fiberglass jacketed oil-water separator is shipped with a vacuum from the factory. When the separator arrives, read the vacuum gauge. If the reading is 7" of Hg or higher, the separator is sound. Sometimes the vacuum can be reduced with changes in elevation and temperature fluctuations even though it is free of leaks. Contact PSI if the reading is less than 7" of mercury.
- 3. Inspect separator when it arrives for general appearance and verify that all components are present. If damage is present or components are missing, provide a written description, have the trucker sign the document, and contact PS International at 605-332-1885. Some minor damage to the exterior fiberglass coating is acceptable and can be touched up with the fiberglass kits.
- 4. PERMATANK installation kits are included with the separator shipment. The kits contain installation procedures with the box and there is also a copy under Section V. APPENDIX in this manual.

B. Preparation

- 1. The bottom and sides of the excavation shall extend a distance of at least one foot around the perimeter of the separator or as required by local conditions. The excavation and backfill shall be free from materials that may cause damage to the vessel or exterior coating.
- 2. Anchor bolts and straps must be placed as to not damage the exterior of the vessel. The tank should be separated from the concrete pad by at least 6" of sand or pea gravel.

C. Placing Separator

- 1. Equipment to lift the separator shall be of adequate size to lift and lower the separator into place without dragging the separator.
- 2. Cables or chains of adequate strength attached to the lifting lugs (not less than 45° included angle) shall be used to lift the separator. A spreader bar should be used if necessary. Chains or slings MUST NOT be used around the separator shell. Separator must be placed level and plumb for proper operation.
- 3. Install hold down straps and backfill around separator using clean non-corrosive inert material. The bottom sides of the separator shall be backfilled by shoveling and tamping to ensure that the bottom quadrant of the separator is evenly supported.
- 4. Separator shall be filled to within 1 foot of the top of the vessel with clean water as soon as separator is in place and properly supported.
- 5. Install the bolt-on manway extensions that are shipped loose for transit. Refer to the PLAN view of the separator detail drawing to make sure the manway extensions are put on in the proper orientation.
- 6. Install the two submersible water pumps inside the 32" x 42" rectangular manway in the lift station. The pumps are installed using the guide rail system. After the guide rails are installed from the base elbows to the brackets at the top of the manway, the pumps can be lowered into place. Wire the pumps to the motor starters located in the control panel. Since pumps are three phase, verify proper pump rotation before making final wiring terminations. See pump and panel information listed in the APPENDIX.

D. Piping Connections

1. Metal or plastic thread or flange protectors should be removed and the appropriate fittings installed using proper joint compound or gaskets. If steel pipe plug(s) are provided for fittings not currently being used, remove plug(s) and reinstall using proper joint compound.

- 2. Inlet piping should be sloped 1/4" to 1/16" per foot for a proper gravity flow system.
- 3. Vent piping must be installed in accordance with governing codes. The manway must be vented to prevent the build-up of hazardous gasses, the inlet must be vented to prevent air lock flow reduction, and the lift station manway must be vented separately to keep vented gas out of the lift station. Refer to section I. WARNING for additional information.
- 4. Install the 2" leak detection riser pipe (Item 28 on Drawing) into the 2" interstitial monitoring coupling on top of the tank (Item 16 on Drawing). The vacuum gauge assembly will need to be removed prior to installation of the pipe. After the pipe is installed, seal around the threads on the tank with the fiberglass touch up kit. The vacuum gauge assembly should be moved to the top of the riser pipe and a vacuum reestablished to verify the tank was not damaged during installation and the riser pipe connection is sound.
- 5. A 2" threaded oil suction pipe with foot valve is shipped loose with the separator. This is for the oil suction pipe and it threads into the 2" full coupling located towards the top of the 36" diameter manway extension. The exterior piping from this connection will be plumbed to the suction side of the centrifugal oil pump.
- 6. A flat bar lifting handle extension is shipped loose with the oil-water separator. The lifting handle extension should be bolted to the lifting bar on the polypropylene media coalescer that is located inside the separator and is accessed through the rectangular manway. With the lifting bar in place, the coalescer can be easily removed and reinstalled from grade.

E. Electrical Accessories

1. PSI has supplied two (2) four level sensors (for oil pump-out and water pump-out), a two level sensor (for alarms in separate oil storage tank), PSLP-1-25 leak probe, NEMA 4X panel A5P3, self-priming, centrifugal oil pump and two (2) submersible pumps with the oil-water separator. See OPERATION section for a description on how electrical accessories operate.

- 2. Install the lift station four level sensor in the 2" sensor coupling inside the rectangular lift station access manway (Item 13 on drawing). Install the separator four level sensor in the 2" sensor coupling inside the round separator access manway (Item 13 on drawing). To install the leak probe, thread the PSLP-1-25 leak detection cable through the bottom of the 2" threaded plug on the PSI furnished N4XPJB junction box. Thread the 2" plug onto the top of the leak riser pipe (Item 28 on Drawing). Use the internal cord grip to suspend the leak probe approximately 2" to 6" off the bottom of the vessel. Run conduit and 14 gauge wire between the control panel and sensors. **The conduit** must be protected from water infiltration, which may cause an electrical short in the system. Connect the sensor wiring to proper terminals on the Warrick intrinsically safe relays mounted in the control panel. Refer to wiring diagrams located in Section V. APPENDIX. The level sensor system remains intrinsically safe when the wiring and conduit are installed with proper explosion proof seals.
- 3. Mount control panel in the location intended for service in a non-hazardous area. The control panel is designed for 460 Volt, three phase utility power.
- 4. Connect the oil pump wiring to the motor starter located in the PSI furnished control panel. Since pump is three phase, verify proper pump rotation before making final wiring terminations. The centrifugal pump is self priming but the oil pump cavity must be initially be filling with fluid to enable it to pull prime. PSI recommends priming the cavity with oil. If the pump cavity is filled with water or water is transferred through the pump during start-up operations, the pump cavity may freeze during cold conditions. To prevent freezing of the pump cavity, make sure only oil is in the pump cavity or provide heat tracing for the pump and piping
- 5. Wire the lift station pumps to the motor starter located in the control panel. Check three phase motors for proper rotation prior to making final terminal connections. See pump and panel information listed in the APPENDIX.

III. OPERATION

A. General

- 1. The PS International oil-water separator is designed to remove free oils and grease. The separator flow rate is listed on the separator drawing in Section V. APPENDIX. PSC model oil-water separators are designed to produce an effluent quality of 10 ppm or less free oil.
- 2. The separator always operates full of liquid. The separator must initially be filled with clean water during installation and refilled with clean water after oil or solids are removed. The separator liquid level is established by the invert elevation of the outlet pipe. As oily waste enters the separator, a corresponding amount of separated effluent is discharged from the separator.
- 3. The following is a description of the flow path through the oil-water separator:
 - a. The influent enters the separator in the sludge compartment. The retention time in the sludge compartment allows heavy solids to drop out of the flow stream. The flow leaves the sludge compartment via the 6" cross-over piping.
 - b. Flow is directed off a single corrugated plate separator set at an angle perpendicular to the flow stream. This method of separation is known as the Buffalo-Morse Principle. The inlet plate reduces the fluid velocity head of the incoming stream and spreads the flow out over the cross sectional area of the separator. The plate corrugations create sinusoidal flow patterns, which causes solids to break out of the flow stream and oil droplets to collide and coalesce.
 - c. The second stage of separation is based upon the proven Royal Dutch Shell Principle of using multiple corrugated parallel plates. The parallel plate pack consists of heavy gauge removable corrugated steel plates. The plates are inclined at a 45° angle to prevent the accumulation of solids. An open area is located

- directly below the plate pack to allow solids to pass downstream and collect behind the sludge baffle.
- d. The sludge baffle in the separator is located directly below the access manway. This provides easy access for removing sludge from grade with the use of a sludge pump or vac truck. The sludge baffle aids in separation by directing flow from the bottom quadrant of the vessel towards the top of the vessel aiding in the flotation of oil droplets.
- e. Model PSC oil-water separators include the use of the PSI polypropylene polishing coalescer. This special matrix of polypropylene fibers of varying sizes is designed to remove oil droplets down to 20 microns in size. Dedicated tracks are provided to enable the coalescer to be removed and reinstalled easily from grade. The coalescer only requires periodic cleaning to remove solids and debris and has an estimated life of over 10 years under normal operating conditions.
- f. Separated effluent is discharged from the separator through the outlet pipe that is located in the most quiescent section of the vessel. The effluent from the separator will contain a free oil effluent quality of no more than 10 ppm.
- g. The flow then enters the integral lift station where it is pumped from the oil-water separator. The pumps can be operated manually or automatically depending upon the position of the Hand-Off-Auto switches on the control panel. See detailed sensor and control panel sequence of operations in the APPENDIX with the pump information.

B. Oil Accumulation

1. The oil-water separator is filled with clean water when it is installed and put into operation. As oily wastewater enters the separator, a corresponding amount of separated effluent is discharged from the separator. Oil droplets that are coalesced in the separator rise to the liquid level surface in the vessel.

- 2. As oil accumulates, it builds a layer downward in the vessel. The level sensor, control panel, and oil pump system are designed to automatically pump oil from the oil-water separator to a separate oil storage tank (by others) when the oil pump H-O-A switch is in the Auto position. If the oil pump should fail or oil enters the separator faster than the oil pump can remove it, the oil level will reach the bottom sensor float. This action will activate the high oil alarm light and horn at the control panel. The horn may be silenced with the silence push button. The light will remain on until the bottom sensor float is raised and the alarm condition is cleared. If the high oil alarm ever activates, the operation of the pump, sensor and control panel should be verified. The activation of the High Oil Level alarm will not turn off the pump. The pump will keep running until it receives a signal from one of the pump off floats. See Sequence of Operation listed in APPENDIX for pump system for a detailed description of oil pump-out system.
- 3. PSI has furnished a two level sensor for the separate oil storage tank (supplied by others) that provides a High Oil Storage Tank Level and High-High Oil Storage Tank Level alarm. If the High High Oil Storage Tank Level alarm ever activates, an interrupt relay will shut off the oil pump and prevent it from operating until the High Oil Storage Tank Level alarm clears.

C. Solids Accumulation

- 1. Most oil-water separators handle run-off from an area where sand, dirt, gravel, grass clippings, debris, etc. can enter the piping system. Since the flow velocity is reduced in an oil-water separator, the debris will collect in the vessel. The amount of accumulation is site specific and will depend upon the quantity of solids in the run-off.
- 2. This oil-water separator includes a 990 gallon solids compartment on the inlet end of the separator for removing a majority of the heavy solids and sediment. The only solids that should pass this chamber are suspended solids. If suspended solids are present in the flow stream, the PSI corrugated plate arrangement is designed to prevent solids accumulation and potential plugging problems.

- 3. The PSI oil-water separator uses a special arrangement of inclined corrugated plates to prevent the accumulation of solids. As the flow stream enters the separator and is directed off the inlet corrugated plate. Suspended solids, if present, can enter the parallel plate pack and settle out of the flow stream. However, the plates are inclined at a 45° angle, which allows the solids to drop out of the plates.
- 4. An open area is located beneath the parallel plate pack to prevent the build-up of solids in front of the plates and allow solids to pass downstream of the pack. The internal hydraulics of the vessel move solids along the bottom of the vessel where they accumulate behind the sludge baffle. See Section IV. MAINTENANCE for information on removing sludge.

D. Electrical Accessories

- 1. For a description of how oil collects in the separator, re-read Paragraph B. Oil Accumulation in this Section III. OPERATION.
- 2. The control panel H-O-A for the Oil Pump should be set in the Auto position when the separator is in normal operation. The oil pump may be temporarily run in the Hand position for manual operation or for testing purposes. If the pump is run in the hand position before oil has reached the level of the suction pipe, water may be pumped. If water is pumped, make sure the pump and piping is protected from freezing.
- 3. Once the pump cavity is initially filled with liquid, the pump is self priming. The pump suction includes a combination strainer/foot valve that make it faster for the pump to start without having to pull liquid up the suction pipe. The strainer/foot valve can be removed from grade if ever needed for inspection.
- 4. PSI has furnished a two level sensor for the separate oil storage tank (supplied by others) that provides a High Oil Storage Tank Level and High-High Oil Storage Tank Level alarm. If the High High Oil Storage Tank Level alarm ever activates, an interrupt relay will shut off the oil pump and prevent it from operating until the High Oil Storage Tank Level alarm clears.

- 5. The lift station contains a four level stainless steel sensor for automatic control of duplex water pump-out system. The control panel is designed for a lead-lag and pump alternating control system when the lift station pump H-O-A switches are in the Auto position. If the water pumps fail to remove water from the lift station, the water level will rise and lift the top float causing the high water alarm to activate. The alarm horn may be silenced with the pushbutton. The alarm light will remain on until the water level is reduced and the top float drops. If a high water alarm condition occurs, the pump operation should be verified. The pumps may be manually operated by placing the H-O-A switch in the Hand position if necessary.
- 6. See detailed Sequence of Operations for the Lift Station pumps, the Oil pump and panel operation in the APPENDIX.
- 7. The leak probe contains an internal float that is down in the dry interstitial space and the switch is closed. If liquid begins to accumulate between the two walls, the float will rise and close its internal switch and activate the leak alarm at the control panel. The horn may be silenced with the silence pushbutton.
- 8. If a leak is ever detected, the separator integrity must be tested by vacuum testing vessel. Contact PSI for instructions

IV. MAINTENANCE

A. General

- 1. It is important to note that each installation is unique. The level and frequency of maintenance performed will vary from site to site. Always refill separator after oil or sludge is removed.
- 2. The PS International oil-water separator is designed for ease of maintenance. Oil and solids levels can be inspected from grade and removed from grade. The parallel plates typically require very little maintenance. Under high solids loading, it may be necessary to inspect the internals of the oil-water separator using proper safety gear and procedures. See section I. WARNINGS. The first inspection of the internals of the separator should be based upon the quantity of sludge that is removed from the separator; however, it should be inspected within the first three years of operation.

B. Oil Level Management

- 1. The separator includes an automatic oil pump-out system. The oil will be removed via the 2" oil suction pipe when oil builds down and immerses the sensor floats. If the oil pump fails to off-load the oil, the oil layer will continue to build down until it reaches the bottom float. The high oil alarm light will illuminate and the horn will sound. The horn may be silenced with the pushbutton; however, the light will remain on until the alarm condition is corrected. If the high oil alarm ever activates, the operation of the pump, sensor and control panel should be verified.
- 2. The oil pump is plumbed to a separate oil storage tank (supplied by others). PSI has furnished a two level sensor for this tank that provides a High Oil Storage Tank Level and High-High Oil Storage Tank Level alarm. If the High High Oil Storage Tank Level alarm ever activates, an interrupt relay will shut off the oil pump and prevent it from operating until the High Oil Storage Tank Level alarm clears.
- 3. If necessary, the oil level may be checked manually by using a gauge stick and water detection paste. The water detection paste will change color when it comes into contact with water. Place the paste on one side of a gauge stick and lower it into the separator. Measure the

distance from the top of the liquid level on the stick to the level where the paste changed color. Refer to the Separator Capacity Chart in Section V. APPENDIX to correlate the thickness of the oil layer to the volume of oil in the vessel.

4. Oil may also be removed by lowering a suction hose from a pump directly into the oil layer through the access manway. Off-load oil from the top down being careful not to lower the pipe into the water layer. Off-load oil until layer is satisfactorily reduced.

C. Sludge Level Management

- 1. The period between sludge level inspection and removal will be determined by experience. With the solids compartment present, PSI recommends checking the separator after the first six months in operation. If solids' loading is high, remove solids and check the level in another three months or less. If solids' loading is low, check the separator after one year of operation and so on as experience dictates.
- 2. Solids accumulate in the inlet solids compartment and can be accessed and removed through the round solids compartment manway. If the level of solids in the sludge compartment is 2' thick or higher, the solids should be removed from the vessel.
- 3. If suspended solids are present, it will be necessary to periodically inspect the separator for solids accumulation. In the oil-water separator, solids collect behind the sludge baffle, which is located below the round access manway. Refer to the separator drawing in Section V. APPENDIX for location. The solids level in the separator can be checked with a long gauge stick by removing the round access manway cover and lowering the stick to the bottom of the vessel. You will be able to determine if the stick is striking accumulated solids or the bottom of the steel vessel. If solids are present, stir around to determine the approximate quantity of solids present.
- 4. If the solids layer behind the secondary sludge baffle is approximately 6" thick or higher, the accumulated solids should be removed from the vessel separator. If the sludge is hard packed, agitating the sludge with a stream of water may assist the removal.

Refill separator with water after performing maintenance.

D. Polypropylene Coalescer

- 1. The coalescer consists of polypropylene media housed in a stainless steel framework. Dedicated channels and a steel lifting handle are provided for removing and reinstalling the coalescer from grade. This secondary coalescer is self-unloading of oil and only needs to be periodically cleaned to remove accumulated solids. Inspect the coalescer after the first six months of operation and then as experience dictates.
- 2. Remove and inspect the coalescer for solids accumulation. Use a pressure washer or other means to clean solids from the coalescer. If necessary, the media may be removed from the stainless steel framework to assist in cleaning. If possible with this installation, the media may be cleaned upstream of the separator, which allows the oily water to flow back into the vessel. After cleaning, reinstall the coalescer back into the separator by sliding it down the steel channels.

E. Electrical Accessories

- 1. Keep the control panel door properly closed when in operation.
- 2. The level sensor floats should be clear of debris and operate freely in their short space on the sensor stem. The level sensors can be periodically removed to check for correct switch operation and inspect the floats. There is no specific inspection period and typically the floats require little attention unless there are gummy oils or a high volume of solids in the flow stream.
- 3. The water pumps may be removed and reinstalled from grade using the lifting chain and guide cable system. See additional information on pump maintenance located in the APPENDIX.
- 4. See detailed Maintenance information on Price (oil) pump found in the APPENDIX.

V. APPENDIX

Find the drawings and information listed below following this page.

- A. Separator Drawing No. PSC-4000-SC-LS-DW-J-00 dated 5-30-13.
- B. PSI Separator Capacity Charts Separator, Lift Station, Solids Compartment
- C. PSI Sensor Drawing No. 4LS-SS-72-5-4-4-SEP dated 5-30-13.

PSI Sensor Drawing No. 4LS-SS-66-5-5-36-LS dated 5-30-13.

Control Panel Detail Drawings (Drawings will be modified and added):

Drawing No. N4XcpA5P3-01

Drawing No. N4XcpA5P3-02

Drawing No. N4XcpA5P3-03

Drawing No. N4XcpA5P3-04

Drawing No. N4XcpA5P3-05

SEPARATOR EFFLUENT PUMP SEQUENCE OF OPERATIONS AND CONTROL LOGIC.

Sequence of Operations – Oil Pump-out with Alarm Detail Drawing No. APO-OIL-1160 Pages 1 of 2 and 2 of 2 dated 5-30-13.

Leak Probe Drawing No. PSLP-1-25 dated 3-25-05.

Leak Sensor Junction Box Drawing No. N4XPJB dated 9-7-10.

- D. Anchor Bolt Footprint Drawing No. ABF-4000-1160 dated 5-30-13. Hold Down Strap Drawing No. HDS-6 dated 6-24-04.
- E. Goulds Model 3SD52H4DA submersible pump information
- F. Price Model SP150AI, Self Priming, Centrifugal Pump Information
- G. PERMATANK Installation Information. Note: This information is also shipped along with the separator in the installation kits

SPECIFICATIONS

Model: PSC-4000-SC-LS-DW-J

Volume: 6,060 Gallons Total

Sludge Compartment: 990 Gallons Separator: 4,020 Gallons

Oil Storage: 2,000 Gallons Maximum Lift Station: 1,050 Gallons

Performance: 10 PPM or Less Free Oil Flow Rate: 0 to 300 gpm Gravity Flow

and Exterior Fiberglass Wall Per UL-1746 Construction: 1/4" ASTM A-36 Carbon Inner Vessel, Interstitial Stand-Off,

Exterior Coating: Fiberglass Interior Coating: None

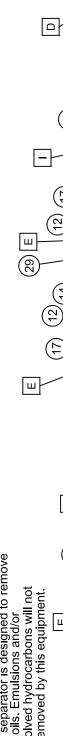
per UL-1746, İncludes 30 Year Warranty Separator Weight: ~12,000 lbs.

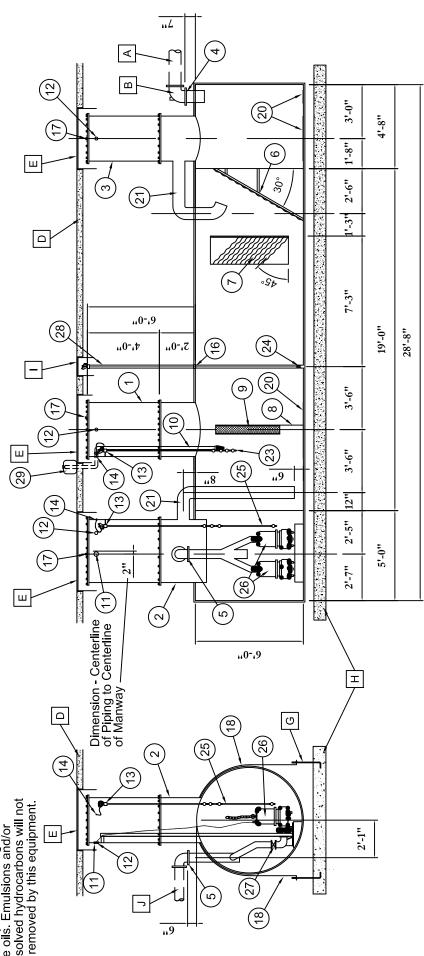
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Max. Burial Depth: 17'-0" Grade to Top of Tank

 \Box

- Vents must be terminated per local codes and for safety requirements
- Separator must be filled with Ö
- clean water prior to being put into service.
- This separator is designed to remove free oils. Emulsions and/or dissolved hydrocarbons will not be removed by this equipment. က





B-B SECTION

SCALE: 3/16" = 1'-0

SCALE: 3/16" = 1'-0"A-A

PSC-4000-SC-LS-DW-J-00

Drawing No.

Checked By:

Date

Drawn: BJS

5-30-13

PS International, Inc. products or services. information and must only be used for the installation, fabrication or promotion of This drawing contains confidential

x 42" I.D. Access Manway for Lift Station (37" x 47" O.D. of Manway Flange) I.D. Access Manway for Sludge Compartment (35" O.D. of Manway Flange) Access Manway for Separator (41" O.D. of Manway Flange)

PSI Furnished Equipment

- 6" 150 lb. Flat Faced Flanged Inlet

6" 150 lb. Flat Faced Flanged Outlet from Pumps

- 10 Gauge Corugated Plate Separator
- 10 Gauge Corrugated Parallel Plate Separator

 - 18" High Sludge Baffle
- Polypropylene Media Final Polishing Coalescer in Stainless Steel Frame 2" NPT Full Coupling with Internal Oil Suction Piping with Foot Valve
 - 3" NPT Full Coupling for Pump Conduit Connectior
 - 2" NPT Half Coupling for Vent Connections

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To Vent Terminations

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- 2" Half-Coupling for Level Sensor Installation
- 1/2" NPT Full Coupling For Sensor Conduit
 - Two (2) Lifting Lugs (Not Shown)
- 2" NPT Half Coupling with Schedule 40 Interstitial Monitoring Pipe 4" NPT Half-Coupling with Plug for Quick Inspection and Gauging Three (3) Epoxy Coated Steel Hold Down Straps
 - - Stainless Steel Identification Plate

(2)

- 1/4" Steel Striker Plate
- Crossover Pipe
- NEMA 4X Control Panel A3P3
- Stainless Steel Four Level Sensor with XP Junction Box Separator Section PSI Model PSLP-1-25 Leak Detection Probe with XP Junction Box
- Stainless Steel Four Level Sensor with XP Junction Box Lift Station Section
- Two (2) Goulds Model 3SD52H4DA Submersible Effluent Pumps with 3 HP, 1750 RPM, 460/3/60 Motors Each to provide 160 GPM @ 25' TDH. Pumps Include
 - Guide Rail System and Stainless Steel Lifting Chain for Easy Pump Removal and Installation from Grade. Motor Includes 20' of Submersible Power Cable

SCALE: 3/16" = 1'-0'

- 2" Pipe 6'-0" Long with Threaded Ends and 2" Coupling on One End Two (2) 4" Check Valves - One for Each Pump Discharge Line 27 28 29

Price Model SP-150Al Self Priming, Centrifugal Pump with 1.5 hp, 460/3/60 XP Motor

Equipment Furnished By Others

- 6" Inlet Piping 6" Short Radius
- Short Radius Elbow (or TEE) with 2" Vent Connection

- 2" Diameter Vent Piping Concrete, Asphalt, Gravel or Other Grade Material Traffic Rated Manway Enclosure Covers (If Required)
- Conduit and Wiring Between Level Sensors, Leak Probe, Pumps and Panel Threaded Anchor Bolts Six (6) 1" A B O O B H O T H O X
 - Concrete Ballast Pad
- 'Curb Box for Access to Interstitial Space
 - 6" Piping from Pump Discharge
- 1-1/2" or Larger Oil Pump Discharge Piping Including Check and Isolation Valves

ВҮ						ıl, Inc.	10 10) -	
REVISIONS:		Project: Oil-Water Separator	Canton, OH Sold To:Canton Drop Forge	4575 Southway Street, SW	Canton, OH 44/06	PS International, Inc.	5309 East Ryan Place	Ph.#: (605) 332-1885	Fax#: (605 332-1293
DATE		PSI Quote No.	3255-1012-H	sales	Order No.	1305-1160	omer	<u>.</u>	13-1727
NUMBER		PSI Qu	3255-	PSI Sales	Orde	1305	Customer	PO No.	13-1

SEPARATOR CAPACITY CHART

PSI Model PSC-4000-SC-LS-DW-J (6' - 0" Diameter x 28' - 8" Long)

SEPARATOR SECTION (6' - 0" Diameter x 19' - 0" Long)

Dandla	Oallana			(6° - 0° Diameter x	•	Danth	0-11
Depth	Gallons	Depth	Gallons	Depth	Gallons	Depth	Gallons
1/2"	3.9	18 1/2"	816.5	36 1/2"	2044.7	54 1/2"	3263.4
1"	11.1	19"	847.7	37"	2080.2	55"	3293.7
1 1/2"	20.4	19 1/2"	879.1	37 1/2"	2115.7	55 1/2"	3323.7
2"	31.3	20"	910.8	38"	2151.2	56"	3353.4
2 1/2"	43.7	20 1/2"	942.8	38 1/2"	2186.7	56 1/2"	3382.8
3"	57.3	21"	975.0	39"	2222.1	57"	3411.9
3 1/2"	72.0	21 1/2"	1007.4	39 1/2"	2257.5	57 1/2"	3440.5
4"	87.8	22"	1040.0	40"	2292.8	58"	3468.8
4 1/2"	104.6	22 1/2"	1072.8	40 1/2"	2328.1	58 1/2"	3496.8
5"	122.2	23"	1105.9	41"	2363.3	59"	3524.3
5 1/2"	140.7	23 1/2"	1139.1	41 1/2"	2398.5	59 1/2"	3551.4
6"	159.9	24"	1172.5	42"	2433.6	60"	3578.1
6 1/2"	179.9	24 1/2"	1206.1	42 1/2"	2468.5	60 1/2"	3604.4
7"	200.7	25"	1239.9	43"	2503.4	61"	3630.2
7 1/2"	222.0	25 1/2"	1273.8	43 1/2"	2538.2	61 1/2"	3655.5
8"	244.1	26"	1307.8	44"	2572.9	62"	3680.3
8 1/2"	266.7	26 1/2"	1342.0	44 1/2"	2607.5	62 1/2"	3704.7
9"	289.9	27"	1376.4	45"	2642.0	63"	3728.4
9 1/2"	313.7	27 1/2"	1410.8	45 1/2"	2676.3	63 1/2"	3751.7
10"	338.0	28"	1445.4	46"	2710.5	64"	3774.3
10 1/2"	362.8	28 1/2"	1480.1	46 1/2"	2744.6	64 1/2"	3796.3
11"	388.2	29"	1514.9	47"	2778.5	65"	3817.7
11 1/2"	414.0	29 1/2"	1549.8	47 1/2"	2812.2	65 1/2"	3838.4
12"	440.2	30"	1584.8	48"	2845.8	66"	3858.4
12 1/2"	466.9	30 1/2"	1619.9	48 1/2"	2879.2	66 1/2"	3877.7
13"	494.0	31"	1655.0	49"	2912.5	67"	3896.1
13 1/2"	521.6	31 1/2"	1690.2	49 1/2"	2945.5	67 1/2"	3913.8
14"	549.5	32"	1725.5	50"	2978.3	68"	3930.5
14 1/2"	577.8	32 1/2"	1760.9	50 1/2"	3011.0	68 1/2"	3946.3
15"	606.5	33"	1796.2	51"	3043.4	69"	3961.1
15 1/2"	635.5	33 1/2"	1831.7	51 1/2"	3075.6	69 1/2"	3974.7
16"	664.9	34"	1867.1	52"	3107.5	70"	3987.0
16 1/2"	694.6	34 1/2"	1902.6	52 1/2"	3139.2	70 1/2"	3998.0
17"	724.6	35"	1938.1	53"	3170.7	71"	4007.2
17 1/2"	755.0	35 1/2"	1973.6	53 1/2"	3201.8	71 1/2"	4014.4
18"	785.6	36"	2009.2	54"	3232.8	72"	4018.3

SEPARATOR CAPACITY CHART

PSI Model PSC-4000-SC-LS-DW-J (6' - 0" Diameter x 28' - 8" Long)

SLUDGE COMPARTMENT SECTION (6' - 0" Diameter x 4' - 8" Long)

Donth	Callona			Donth		•	Callona
Depth	Gallons	Depth	Gallons	Depth	Gallons	Depth	Gallons
1/2"	1.0	18 1/2"	200.5	36 1/2"	502.1	54 1/2"	801.4
1"	2.7	19"	208.2	37"	510.9	55"	808.9
1 1/2"	5.0	19 1/2"	215.9	37 1/2"	519.6	55 1/2"	816.2
2"	7.7	20"	223.7	38"	528.3	56"	823.5
2 1/2"	10.7	20 1/2"	231.5	38 1/2"	537.0	56 1/2"	830.7
3"	14.1	21"	239.4	39"	545.7	57"	837.9
3 1/2"	17.7	21 1/2"	247.4	39 1/2"	554.4	57 1/2"	844.9
4"	21.6	22"	255.4	40"	563.1	58"	851.9
4 1/2"	25.7	22 1/2"	263.5	40 1/2"	571.7	58 1/2"	858.7
5"	30.0	23"	271.6	41"	580.4	59"	865.5
5 1/2"	34.5	23 1/2"	279.7	41 1/2"	589.0	59 1/2"	872.2
6"	39.3	24"	287.9	42"	597.6	60"	878.7
6 1/2"	44.2	24 1/2"	296.2	42 1/2"	606.2	60 1/2"	885.2
7"	49.3	25"	304.5	43"	614.8	61"	891.5
7 1/2"	54.5	25 1/2"	312.8	43 1/2"	623.3	61 1/2"	897.7
8"	59.9	26"	321.2	44"	631.9	62"	903.8
8 1/2"	65.5	26 1/2"	329.6	44 1/2"	640.4	62 1/2"	909.8
9"	71.2	27"	338.0	45"	648.8	63"	915.6
9 1/2"	77.0	27 1/2"	346.5	45 1/2"	657.2	63 1/2"	921.3
10"	83.0	28"	355.0	46"	665.6	64"	926.9
10 1/2"	89.1	28 1/2"	363.5	46 1/2"	674.0	64 1/2"	932.3
11"	95.3	29"	372.0	47"	682.3	65"	937.5
11 1/2"	101.7	29 1/2"	380.6	47 1/2"	690.6	65 1/2"	942.6
12"	108.1	30"	389.2	48"	698.9	66"	947.5
12 1/2"	114.7	30 1/2"	397.8	48 1/2"	707.1	66 1/2"	952.3
13"	121.3	31"	406.4	49"	715.2	67"	956.8
13 1/2"	128.1	31 1/2"	415.1	49 1/2"	723.4	67 1/2"	961.1
14"	134.9	32"	423.8	50"	731.4	68"	965.3
14 1/2"	141.9	32 1/2"	432.4	50 1/2"	739.4	68 1/2"	969.1
15"	148.9	33"	441.1	51"	747.4	69"	972.8
15 1/2"	156.1	33 1/2"	449.8	51 1/2"	755.3	69 1/2"	976.1
16"	163.3	34"	458.5	52"	763.1	70"	979.1
16 1/2"	170.6	34 1/2"	467.2	52 1/2"	770.9	70 1/2"	981.8
17"	178.0	35"	476.0	53"	778.6	71"	984.1
17 1/2"	185.4	35 1/2"	484.7	53 1/2"	786.3	71 1/2"	985.9
18"	192.9	36"	493.4	54"	793.9	72"	986.8

SEPARATOR CAPACITY CHART

PSI Model PSC-4000-SC-LS-DW-J (6' - 0" Diameter x 28' - 8" Long)

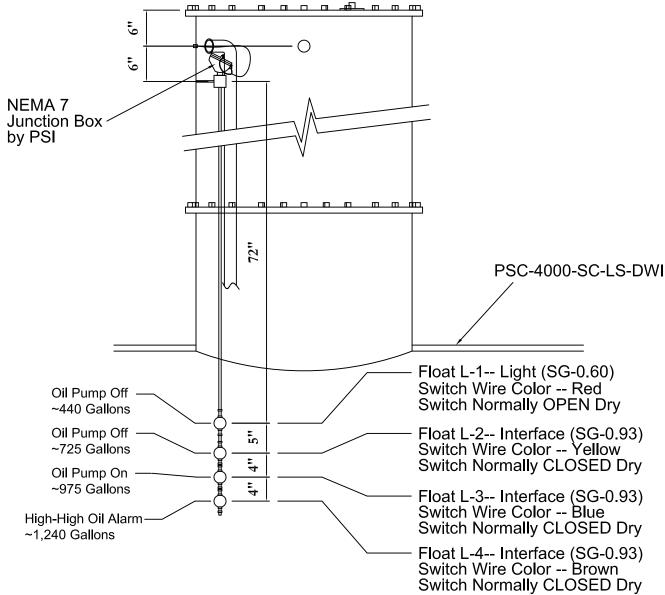
LIFT STATION SECTION (6' - 0" Diameter x 5' - 0" Long)

D 41-	0-11			(6' - 0" Diameter x	<u> </u>	D (l)	0-11
Depth	Gallons	Depth	Gallons	Depth	Gallons	Depth	Gallons
1/2"	1.0	18 1/2"	214.9	36 1/2"	538.1	54 1/2"	858.8
1"	2.9	19"	223.1	37"	547.4	55"	866.8
1 1/2"	5.4	19 1/2"	231.4	37 1/2"	556.8	55 1/2"	874.7
2"	8.2	20"	239.7	38"	566.1	56"	882.5
2 1/2"	11.5	20 1/2"	248.1	38 1/2"	575.4	56 1/2"	890.2
3"	15.1	21"	256.6	39"	584.8	57"	897.9
3 1/2"	19.0	21 1/2"	265.1	39 1/2"	594.1	57 1/2"	905.4
4"	23.1	22"	273.7	40"	603.4	58"	912.9
4 1/2"	27.5	22 1/2"	282.3	40 1/2"	612.7	58 1/2"	920.2
5"	32.2	23"	291.0	41"	621.9	59"	927.4
5 1/2"	37.0	23 1/2"	299.8	41 1/2"	631.2	59 1/2"	934.6
6"	42.1	24"	308.6	42"	640.4	60"	941.6
6 1/2"	47.4	24 1/2"	317.4	42 1/2"	649.6	60 1/2"	948.5
7"	52.8	25"	326.3	43"	658.8	61"	955.3
7 1/2"	58.4	25 1/2"	335.2	43 1/2"	668.0	61 1/2"	962.0
8"	64.2	26"	344.2	44"	677.1	62"	968.5
8 1/2"	70.2	26 1/2"	353.2	44 1/2"	686.2	62 1/2"	974.9
9"	76.3	27"	362.2	45"	695.3	63"	981.2
9 1/2"	82.5	27 1/2"	371.3	45 1/2"	704.3	63 1/2"	987.3
10"	88.9	28"	380.4	46"	713.3	64"	993.2
10 1/2"	95.5	28 1/2"	389.5	46 1/2"	722.3	64 1/2"	999.0
11"	102.1	29"	398.7	47"	731.2	65"	1004.7
11 1/2"	108.9	29 1/2"	407.8	47 1/2"	740.1	65 1/2"	1010.1
12"	115.8	30"	417.1	48"	748.9	66"	1015.4
12 1/2"	122.9	30 1/2"	426.3	48 1/2"	757.7	66 1/2"	1020.4
13"	130.0	31"	435.5	49"	766.4	67"	1025.3
13 1/2"	137.3	31 1/2"	444.8	49 1/2"	775.1	67 1/2"	1029.9
14"	144.6	32"	454.1	50"	783.8	68"	1034.3
14 1/2"	152.1	32 1/2"	463.4	50 1/2"	792.4	68 1/2"	1038.5
15"	159.6	33"	472.7	51"	800.9	69"	1042.4
15 1/2"	167.2	33 1/2"	482.0	51 1/2"	809.4	69 1/2"	1046.0
16"	175.0	34"	491.3	52"	817.8	70"	1049.2
16 1/2"	182.8	34 1/2"	500.7	52 1/2"	826.1	70 1/2"	1052.1
17"	190.7	35"	510.0	53"	834.4	71"	1054.5
17 1/2"	198.7	35 1/2"	519.4	53 1/2"	842.6	71 1/2"	1056.4
18"	206.7	36"	528.7	54"	850.7	72"	1057.5

PSI Four Level Sensor Detail

Stainless Steel Stem and Floats

Scale: 3/4" = 1'-0"



NOTES

- 1. Each float switch contains two wires to be connected to intrinsically safe relay mounted in control panel.
- 2. Sensor includes internal magnetic reed switch to interface with intrinsically safe relay.

PSI Quote No. 3255-1012-H

PSI Sales Order No. 1305-1160

Customer PO No. 13-1727 Project: Oil-Water Separator Canton Drop Forge Canton, OH Sold To: Canton Drop Forge 4575 Southway Street, SW Canton, OH 44706



PS International, Inc.

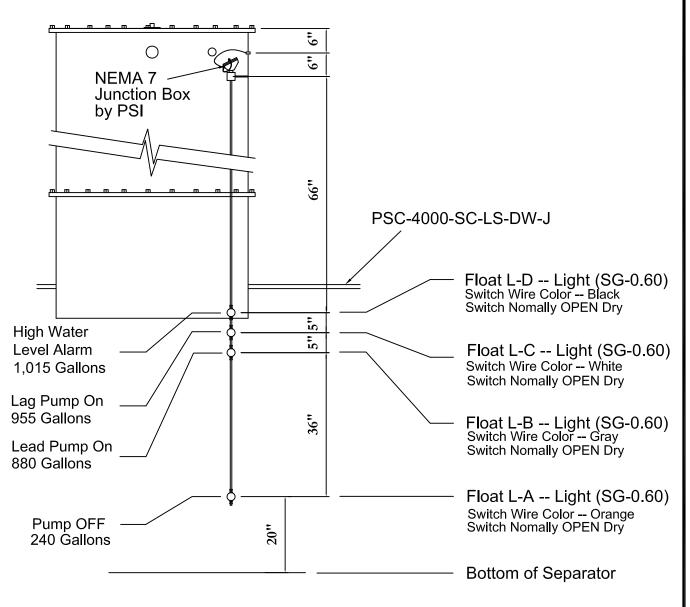
5309 East Ryan Place Sioux Falls, S.D. 57110 Ph.#: (605) 332-1885 Fax#: (605) 332-1293

Orawn:	Date:	Checked By:	Drawing No.	Rev.
BJS	5-30-13	GWP	4LS-SS-72-5-4-4-SEP	0

PSI Four Level Sensor Detail

Stainless Steel Stem and Floats

Scale: 1/2" = 1'-0"



NOTES

- 1. Each sensor float switch contains two wires to be connected to Warrick Series 67 relay mounted in control panel.
- 2. Sensor includes internal magnetic reed switch to interface with intrinsically safe relay.

PSI Quote No. 3255-1012-H

PSI Sales Order No. 1305-1160

Customer PO No. 13-1727 Project: Oil-Water Separator Canton Drop Forge Canton, OH Sold To: Canton Drop Forge 4575 Southway Street, SW Canton, OH 44706



PS International, Inc. 5309 East Ryan Place Sioux Falls, S.D. 57110

Ph.#: (605) 332-1885 Fax#: (605 332-1293

Drawn: BJS Date: 5-30-13

Checked By: GWP Drawing No. 4LS-SS-66-5-5-36-LS Rev. 0

SEPARATOR EFFLUENT PUMP SEQUENCE OF OPERATIONS AND CONTROL LOGIC

There are two (2) pumps in the lift station. There are two (2) Hand-Off-Auto (HOA) switches on the control panel (one for each pump). The following describes the pump operation in detail for each HOA switch position.

A. HAND Mode

- 1. Each pump may be run manually by placing their respective HOA switch in the Hand position. This action will turn on the pump(s) and the pump(s) will remain on until the switch(es) is placed in the OFF or AUTO position.
- 2. The pump(s) may not necessarily turn off if the HOA switch is changed from Hand to Auto since in the auto position, the pump will operate in conjunction with the level sensor and water level in the lift station.
- 3. With the HOA switch in the HAND position, the level sensors will have NO effect on the operation of the pump(s).

B. OFF Mode

- 1. Each pump may be turned off manually by placing their respective HOA switch in the OFF position. This action will turn the pump(s) off and not allow them to turn on. This feature is useful if one pump is taken out of service for maintenance.
- 2. With the HOA switch in the OFF position, the level sensors will have NO effect on the operation of the pump(s).

C. AUTO Mode

- 1. Each pump may be run automatically in conjunction with the position of the four level sensor floats in the lift station by placing their respective HOA switch in the Auto position.
- 2. If both HOA switches are in the Auto position, the pumps will operate as follows:
 - a. Float L-1 (Pump Off float) When water in the lift station is at this level, both pumps will be off.

- b. Float L-2 (Lead Pump On float) When water in the lift station reaches this level, the lead pump will turn on. The lead pump will remain on until the water level in the compartment lowers and reaches the pump off float L-1. NOTE THAT THE WARRICK SERIES 67 RELAY MOUNTED IN THE CONTROL PANEL HAS AN INTERNAL ALTERNATOR WHERE THE LEAD PUMP ON THE FIRST CYCLE WILL BECOME THE LAG PUMP ON THE NEXT CYCLE. THIS WILL REPEAT FOR EACH COMPLETE CYCLE WHERE THE WATER LEVEL HAS BEEN SUCCESSFULLY LOWERED TO REACH THE PUMP OFF FLOAT (L-1). THE SECOND PUMP WILL BECOME THE LAG PUMP DURING EACH CYCLE AND ALTERNATE ACCORDINGLY. If the lead pump (at that particular cycle) has the HOA switch in the Off position, no action will occur.
- c. Float L-3 (Lag Pump On float) When water in the lift station reaches this level, the lag pump will turn on. The lag pump will remain on until the water level in the compartment lowers and reaches the pump off float L-1. If both HOA switches are in the Auto position, both pumps will remain on until the water level in the compartment lowers and reaches the pump off float L-1 (both pumps will turn off). If the lag pump HOA switch is in the Off position, the lag pump will not turn.
- d. Float L-4 (High Water Alarm float) When water in the lift station reaches this level, the high water alarm at the control panel will activate. The alarm horn may be silenced by the pushbutton; however, the alarm will remain on until water is removed causing the Float L-4 to drop. If this action ever occurs, the position of the HOA switches should be checked and the operation of the pump(s) should be verified. High water alarm will not turn off the pumps. They pump run signal will continue until the water level reaches the pump off float.



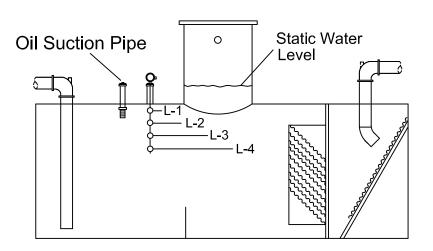
TITLE: Canton Drop Forge Canton, OH

Canton Drop Forge P.O. 13-1727

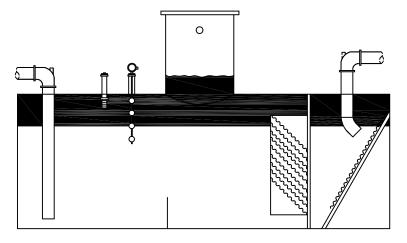
DATE: DRWG NO.: PAGE: REV. 5-30-13 APO-OIL-1160 1 of 2 0

This drawing contains confidential information and must only be used for the installation, fabrication or promotion of PS International, Inc. products or services.

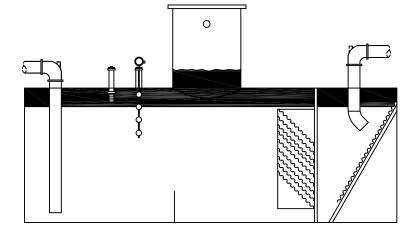
Sequence of Operations - Oil Pump-out with Alarm



Separator filled with water only. All floats are up. Liquid level is in the manway. Little or no oil is present.



Oil accumulates and builds a layer down until it reaches the Float L-3. Pump Starts.



If water is entering the separator as oil is being pumped out, the oil-water interface will rise until it reaches the Float L-2. This action will stop the pump and prevent water from being tranferred to storage.

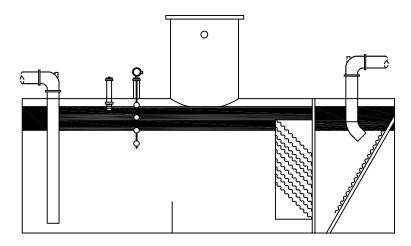


TITLE: Canton Drop Forge Canton, OH

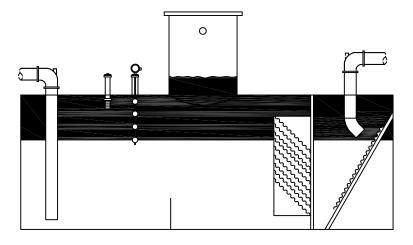
Canton Drop Forge P.O. 13-1727

DATE: DRWG NO.: PAGE: REV. 5-30-13 APO-OIL-1160 2 of 2 0

This drawing contains confidential information and must only be used for the installation, fabrication or promotion of PS International, Inc. products or services.



The influent flow is low while oil is being pumped out and the oil pump succeeds in lowering the oil level. The oil level will lower until it reaches Float L-1. This action will stop the pump.



If oil pump fails to remove oil and/or oil enters separator faster than oil pump removes it, oil will accumulate until it reaches the Float L-4. High oil alarm will activate.

SUMMARY

Float L-1 will float in oil OR water and will turn OFF pump when oil level is lowered to float level.

Float L-2 will float in water and sink in oil and will turn OFF pump after oil pump has activated if oil-water interface rises to float level.

Float L-3 will float in water and sink in oil and will turn pump ON when oil accumulates down to float level.

Float L-4 will float in water and sink in oil and will activate high oil alarm.



PS International, Inc.

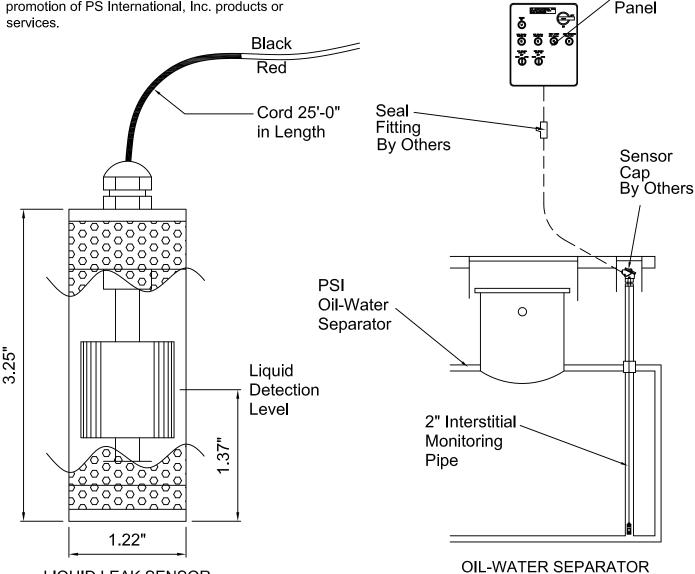
5309 East Ryan Place Sioux Falls, S.D. 57110 Ph. #: (605) 332-1885 Fax #: (605) 332-1293 TITLE: Model PSLP-1 Leak Detection Probe Detail

DATE: 3-25-05

Drwg No: PSLP-1-25

Alarm

This drawing contains confidential information and must only be used for the installation, fabrication or promotion of PS International, Inc. products or services.



LIQUID LEAK SENSOR

Full Scale

MATERIAL

Body: PVC/SS Stem: PVC Float: Buna-N

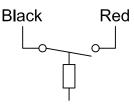
Sceen: 304 SS Perforated Wiring: 2 Cond Cable with

Black and Red 22 Ga. Wire PVC 25

Feet

MODEL: PSLP-1 SENSOR NORMALLY OPEN

(CLOSES ON LIQUID LEVEL)





PS International, Inc.

5309 East Ryan Place Sioux Falls, S.D. 57110 Ph. #: (605) 332-1885 Fax #: (605) 332-1293 TITLE: Model N4XPJB

Junction Box Detail

Housing for PSLP-1 Leak Probe

DATE: 9-7-10

Drwg No: N4XPJB

Rev.

This drawing contains confidential information and must only be used for the installation, fabrication or promotion of PS International, Inc. products or services.

3-3/4" Cord Grip for Holding o. Leak Probe Cable 3/4" NPT 1/2" NPT Stainless Steel Screw Plug with 1/2" Nipple, 1-1/4" Square Nut and 2" NPT Threaded Plug -1/2" OPENING

LEAK SENSOR JUNCTION BOX HOUSING

MATERIAL: Copper-Free Aluminum

CERTIFICATION: FM / CSA / Explosion Proof Certified, NEMA 4X / IP 68

CONDUIT CONNECTION: 3/4" NPT SCREW PLUG CONNECTION: 2" NPT SURFACE FINISHING: Epoxy Coating

"O" RING: Buna "N" WEIGHT: 2.0 lb



Ph. #: (605) 332-1885 Fax #: (605) 332-1293 TITLE: Canton Drop Forge
Canton, OH

Canton Drop Forge P.O. 13-1727

DATE: DRWG NO.: 5-30-13 ABF-4000-1160

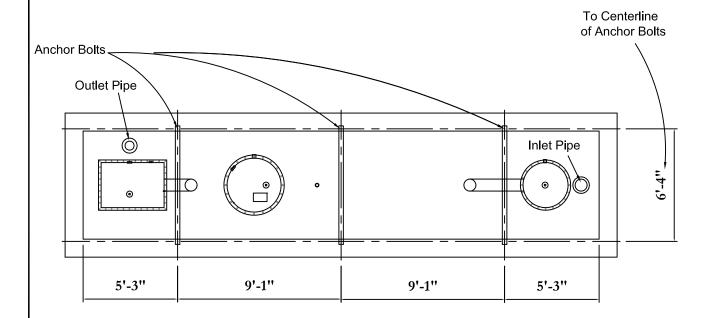
PAGE: 1 of 1 REV.

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ANCHOR BOLT FOOTPRINT

PSI SEPARATOR MODEL PSC-4000-SC-LS-DW-J

Scale: 3/8" = 1'-0"



NOTES

- 1. Typical Ballast pad extends 1' from the heads of the vessel and 1' from the shell of the vessel.
- 2. Fabrication note: The placement of the lifting lugs must not interfere with hold down strap location.



TITLE: Typical 6'-0" Diameter Hold Down Strap Detail

DATE: DRWG NO.: 6-24-04 HDS-6

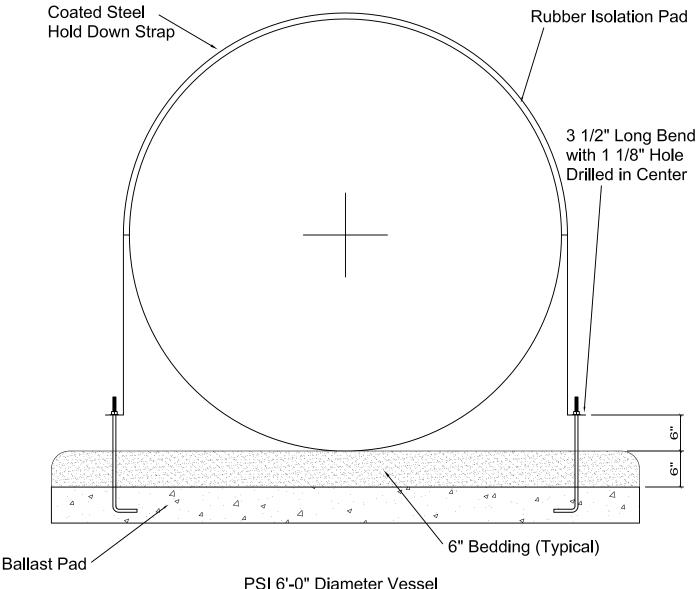
PAGE: 1 of 1 REV.

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HOLD DOWN STRAP DETAIL

PSI 6'-0" Diameter Vessel

Scale: 3/4" = 1'-0"



3 Straps, 3" Wide, 1/4" Thick Use 1" Threaded Anchor Bolt (By Others)

TECHNICAL BROCHURE

B3SD



Lift Station Pumps for Oil-Water Separator PSC-4000-SC-LS-DW-J Goulds Model 3SD52H4DA

3SD

SUBMERSIBLE SEWAGE PUMP
DUAL SEAL WITH SEAL SENSOR PROBE



FEATURES

Impeller: Cast iron, two vane semi-open, non-clog with pump-out vanes for mechanical seal protection. Balanced for smooth operation. Silicon bronze impeller available as an option.

Casing: Heavy duty cast iron, volute type for maximum efficiency. 3" flange conforms to 125 # ANSI standard. Connects to A10-30 guide rail system.

Dual Mechanical Seals: Silicon carbide vs. silicon carbide outer seal and ceramic vs. carbon inner seal, stainless steel metal parts, BUNA-N elastomers. Upper and lower shaft seals are positioned independently and are separated by an oil-filled chamber.

Seal Sensor Probe: Located in oil-filled chamber. If pumpage should begin to leak past lower seal it indicates to pump control panel a fault has occurred. Requires optional Seal Fail Circuit in the control panel.

Shaft: 300 series stainless steel keyed design.

Fasteners: 300 series stainless steel.

Capable of running dry without damage to components.

AGENCY LISTINGS



Tested to UL 778 and CSA 22.2 108 Standards By Canadian Standards Association File #LR38549

APPLICATIONS

Used in a variety of residential, commercial and industrial applications such as:

- Sewage systems
- Hospitals
- Flood and pollution control
- Trailer courts
- Dewatering/Effluent
- Motels

Farms

SPECIFICATIONS

Pump:

• Maximum solid size: 2.5"

• Discharge size: 3", 125 # ANSI flange

Maximum capacity: 470 GPM

• Maximum total head: 65 feet

• 300 Series stainess steel fasteners

• 20' Power cord

• Standard silicon carbide/silicon carbide outer seal

Motor:

- Maximum ambient temperature: 104° F (40° C) continuous duty, 140° F (60° C) intermittent duty
- Rated for continuous duty when fully submerged
- Insulation: Class F
- 60 Hertz
- Single row ball bearings
- 300 Series stainless steel keyed shaft

Single Phase:

- 1.5 5 HP; 298 and 230 volts
- Built-in thermal overloads with automatic reset
- Built-in capacitors

Three Phase:

- 1.5 5 HP; 200, 230, 460 and 575 volts
- Class 10 overload protection must be provided in control panel

MOTORS

- Fully submerged in oil-filled chamber. High grade turbine oil surrounds motor for more efficient heat dissipation, permanent lubrication of bearings and mechanical seal for complete protection against outside environment.
- Class F insulation
- Designed for Continuous Operation: Pump ratings are within the motor manufacturer's recommended working limits and can be operated continuously without damage when fully submerged.
- Bearings: Upper and lower heavy duty ball bearing construction for precision positioning of parts and to carry thrust loads.
- Power and Control Cables: Severe duty rated, oil and water resistant. Epoxy seal on motor end provides secondary moisture barrier in case of outer jacket damage and to prevent oil wicking. 20 foot standard with optional lengths available.
- O-ring: Assures positive sealing against contaminants and oil leakage.

MODEL AND MOTOR INFORMATION

Order No.	НР	Phase	Volts	RPM	Impe	ller	Maximum	L.R.	KVA	Power	F.L. Motor	Resi	stance	Weight										
Order No.	ПР	Phase	voits	KPIVI	Dia. (in.)	Code	Amps	Amps	Code	Cable	Efficiency %	Start	Line-Line	(lbs.)										
3SD52F8EA		1	208				15.0	50.8	В	14/3	80	1.1	0.9	192										
3SD52F1EA		ľ	230					13.5	29.5	Е	14/3	70	1.4	1.8	172									
3SD52F2EA	1.5		200	1750	1750	5.25	E	11.5	40.9	Н		81		1.7										
3SD52F3EA	1.5	3	230	1730	3.23	_	10.0	40.0	F	14/4	83	NA	2.3	190										
3SD52F4EA]	460				5.0	20.0	F	14/4	83	IVA	9.3] 170										
3SD52F5EA			575				4.0	14.4	Н		74		14.8											
3SD52F8DA		1	208				15.0	50.8	В	14/3	80	1.1	0.9	192										
3SD52F1DA		'	230				13.5	32.7	Е	14/3	70	1.4	1.8	172										
3SD52F2DA	1.5		200	1750	6.50	D	11.5	43.0	Н		81		1.7											
3SD52F3DA	1.5	3	230	1730	0.50		10.0	40.0	F	14/4	83	NA	2.3	190										
3SD52F4DA]	460									1					5.0	20.0	F	14/4	83	INA	9.3	1/0
3SD52F5DA			575				4.0	14.4	Н		74		14.8											
3SD52G8CA		1	208										19.0	50.8	В	14/3	80	1.1	0.9	196				
3SD52G1CA		'	230		7.00	7.00 C	160	36.9	D	. ,, 5	75	1.4	1.5											
3SD52G2CA	2		200	1750			11.5	43.0	Н	14/4	81	NA	1.7	194										
3SD52G3CA	_	3	230	1730	7.00		10.0	40.0	F		83		2.3											
3SD52G4CA]	460				5.0	20.0	F	14/4	83	IVA	9.3] 174										
3SD52G5CA			575					4.0	14.4	Н		74		14.8										
3SD52H8BA		1	208				25.5	50.8	В	10/3	80	1.1	0.9	205										
3SD52H1BA		'	230				21.5	46.4	С	10/3	79	1.0	1.0	203										
3SD52H2BA	3		200	1750	7.25	В	15.2	43.0	G	10/4	85		1.3											
3SD52H3BA		3	530	1730	7.25	"	12.0	49.5	++		83	NA	1.9	200										
3SD52H4BA			460				6.0	24.8	Н	14/4	83	INA	7.5] 200										
3 3D52H5BA			-575				4.8	17.3	G		78		11.6											
3SD52J1AA		1	230				26.5	57.7	Α	10/3	80	1.0	0.8	210										
3SD52J2AA			200				18.8	77.8	F	10/4	84		0.9											
3SD52J3AA	5	3	230	1750	8.00	А	16.4	63.6	Е	10/4	85	NA	1.2	205										
3SD52J4AA			460	8.2 3	31.8	E	14/4	85	IVA	4.8														
3SD52J5AA			575				6.8	22.8	Е	14/4	80		7.4											

NOMENCLATURE DESCRIPTION



1st, 2nd and 3rd Character - Discharge Size and Type

3SD = 3" discharge, 2.5" solids handling, dual seal with seal fail probe in pump.



4th Character - Mechanical Seals

- = Silicon carbide/silicon carbide/BUNA lower sea and carbon/ceramic/BUNA - upper seal (standard)
- 3 = Silicon carbide/tungsten carbide/BUNA lower seal and carbon/ceramic/BUNA - upper seal (optional)



5th Character - Cycle/RPM

2 = 60 Hz/1750 RPM6 = 50 Hz/1450 RPM

6th Character - Horsepower

 $F = 1\frac{1}{2} HP$ ► H = 3 HP J = 5 HP

- 7th Character Phase/Voltage 1 = single phase, 23 4 = three phase, 460 V 2 = three phase, 200 V 5 = three phase, 575 V
- 3 =three phase, 230 V 8 =single phase, 208 V

8th Character - Impeller Diameter

A = 8.00" C = 7.00" E = 5.25" B = 7.25" D = 6.50"

9th Character - Cord Length (Power and Sensor)

A = 20' (standard) F = 50'D = 30'J = 100'

10th Character - Options

B = Bronze impeller

E = Epoxy paint

F = Both epoxy paint and bronze impeller

11th Character - Option

H= Pilot duty thermal sensors

APPLICATION DATA

Maximum Solid Size	2½"
Minimum Casing Thickness	5/16"
Casing Corrosion Allowance	1/8"
Maximum Working Pressure	30 PSI
Maximum Submergence	50 feet
	Fully submerged for continuous operation
Minimum Submergence	6" below top of motor for intermittent
	operation
Maximum Environmental	40°C (104°F) continuous operation
Temperature	60°C (140°F) intermittent operation

CONSTRUCTION DETAILS

,				
14/3, type SJTOW: single phase, ½ & 2 HP				
14/3, type STOW: single phase, ½ - 3 HP & 5 HP, 460 V				
10/3, type STOW: single phase, 3 & 5 HP, three phase 5 HP, 230 V				
16/2, type SJTOW: seal sensor only				
18/4, type SJTOW: seal/heat sensor				
Gray Cast Iron - ASTM A48 Class 30				
Gray Cast Iron - ASTM A48 Class 30				
Gray Cast Iron - ASTM A48 Class 30				
Gray Cast Iron - ASTM A48 Class 30				
Gray Cast Iron - ASTM A48 or Cast Bronze - ASTM B584 C87600				
AISI 300 Series Stainless Steel				
NEMA 56 Frame, oil filled with Class F Insulation				
Single Phase: on winding thermal overload protection				
Three Phase: require ambient compensated Class 10, quick trip overloads in the control panel.				
Seal fail sensor in an oil-filled seal chamber. Connect to an optional relay in control panel.				
Normally closed on-winding thermostats open at 275° F (135°C) and close at 112° F (78° C). Require terminal connection in the control panel.				
300 Series Stainless Steel				
Semi-opened with pump out vanes on back shroud				
1.75 quarts				
7.0 quarts				

STANDARD PARTS

Pall Pagring	Upper	Single row ball - SKF™ 6204-2Z				
Ball Bearing	Lower	Single row ball - SKF™ 6206-2Z				
Mechanical Seals -	Upper	Carbon/Ceramic; Type 21				
Standard	Lower	Silicon Carbon/Silicon Carbon; Type 21				
Mechanical Seals - Optional Lower		Silicon Carbide/Tungsten Carbide: Type 21				
O-Ring - Stuffing Box		BUNA-N, AS 568A-163				
O-Ring - Motor Cover		BUNA-N, AS 568A-166				



Xylem, Inc.

2881 East Bayard Street Ext., Suite A

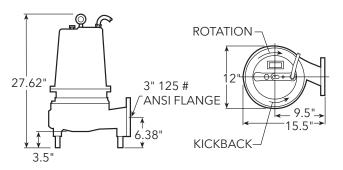
Seneca Falls, NY 13148 Phone: (866) 325-4210 Fax: (888) 322-5877

www.xyleminc.com/brands/gouldswatertechnology

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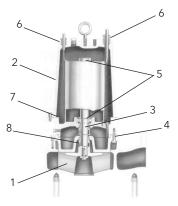
DIMENSIONS

(All dimensions are in inches. Do not use for construction purposes.)



MATERIALS OF CONSTRUCTION

Item	Part N			Material					
No.	Part N	ame		Standard	I	0	Optional		
1	Impell	er, non-clo	og	1003			1179		
2	Castin	gs		1003					
3	Shaft-l	Keyed		300 Series	SS				
4	Fasten	ers		300 Series	SS				
5	Ball be	earings		Steel					
6	Power	cable		CTOW 20 f	Additional				
0	Seal se	ensor cabl	е	STOW, 20 fe			lengths		
7	O-ring			BUNA-N					
	Outer Mech. Seal	Service	Rotary	Stationary	Elasto- mers		Metal Parts		
8	OPT	Heavy duty	Silicon Carbide		BUN	IA-N	300 Series SS		
→	- STD	Mild abrasives	Silico	n Carbide	BUNA-N		300 Series SS		
	Mater	ial Code		Engineering Standard					
	1	003	Cast iron – ASTM A48 Class 30						
1179 Sil				licon bronze – ASTM C87600					

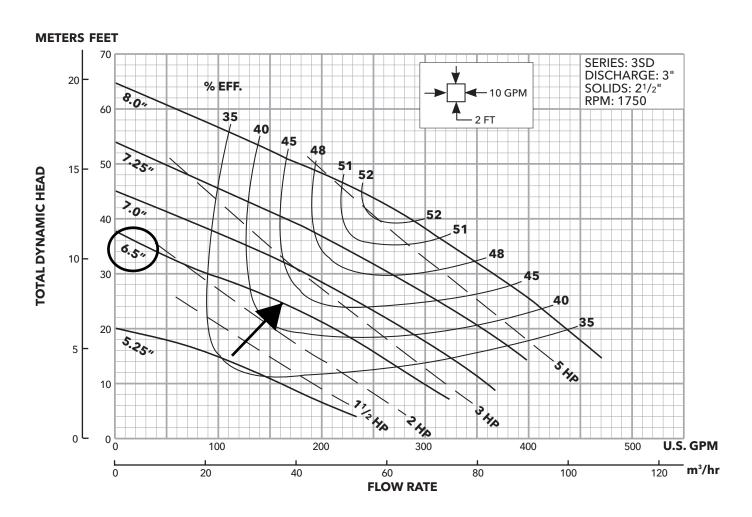




a **xylem** brand

35D Submersible Sewage Pumps

Impeller Code	Impeller Diameter	Motor HP Rating
А	8"	5
В	7.25"	3
С	7"	2
D	6.50"	1.5
E	5.25"	1.5

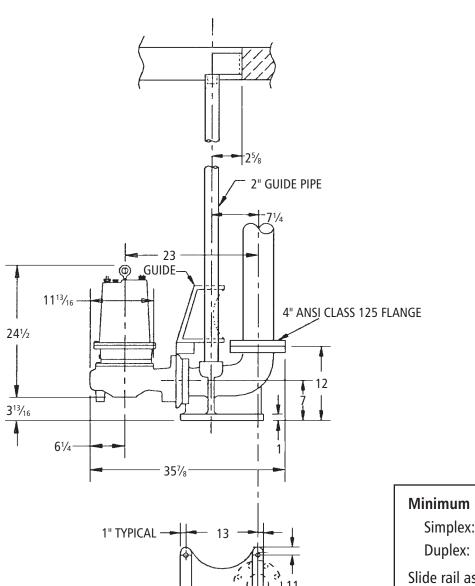




GOULDS PUMPS Wastewater

TYPICAL INSTALLATION DRAWING - 3SD

Submersible Sewage Pump – 3 x 4 Slide Rail (A10-30 assembly)



Minimum basin diameters

Simplex: 36" Duplex: 48"

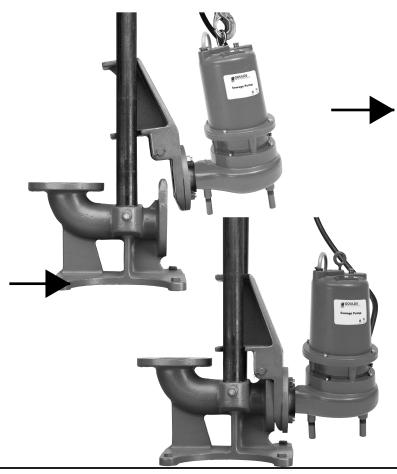
Slide rail assemblies must use hatch door style covers.

 $\frac{7}{8}$ DIA. – 4 HOLES

11/2" TYPICAL

TECHNICAL BROCHURE

BCPCGR



FEATURES

A10-30, 3" X 4" RAIL SYSTEM:

Connects to any pump with a 3", 150# ANSI flanged discharge. Outlet is a 4" flanged discharge.

A10-40, 4" X 4" RAIL SYSTEM:

Connects to any pump with a 4", 150# ANSI flanged discharge. Outlet is a 4" flanged discharge.

A10-60, 4" X 6" RAIL SYSTEM:

Connects to any pump with a 4", 150# ANSI flanged discharge. Outlet is a 6" flanged discharge.

ALL MODELS:

Cast iron construction for standard applications.

Optional bronze pump adapter for applications requiring a non-sparking disconnect.

Standard kit contains a Base, a Pump Adapter with all required bolts and fittings and the Upper Guide Rail Positioning Bracket.

Optional intermediate guide rail brackets are available in either steel or brass for non-sparking applications.

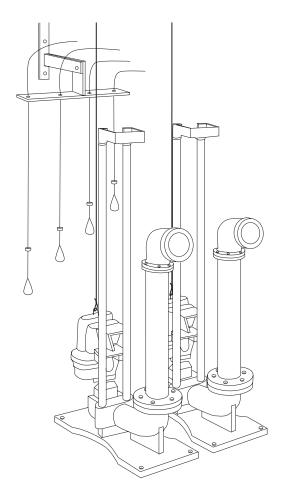
Guide rails are not supplied - they may be sourced locally - 2" stainless steel guide rails recommended.

Spare pump adapter kits are available for those who want a back-up pump/adapter ready for an emergency quick change.

GUIDE RAIL SYSTEMS

EFFLUENT AND SEWAGE





PUMP ADAPTER KITS

1K340 - for A10-30 iron

1K341 - for A10-40 / A10-60 iron

1K447 - for A10-30B brass

1K448 - for A10-40B / A10-60B brass

Part numbers are for repairs, component is included in the A10-30, 40 accessory.

INTERMEDIATE GUIDE RAIL BRACKET

A10-30 (B) standard	4K436
A10-40 (B), 60 (B) standard	4K437
A10-30 304 SS	4K631
A10-40 304 SS	4K632

Used on pits over 11 feet for extra support. Must be purchased separately.

MINIMUM BASIN DIAMETER

	Minimum	Recommended
Simplex	36"	42"
Duplex	48"	60"

Pump Discharge Size	Order Number	ANSI Flanged Discharge Size	Material of Positioning Bracket	Used On These Pumps
3"	A10-30		Carbon Steel	3WDA, 3DWS, 3WS, 3888D3, 3SD
3"	A10-30SS	All AFO II ANICI	Stainless Steel	3GV, 3MV, 3MK
4"	A10-40	4" 150 lb. ANSI	Carbon Steel	
4"	A10-40SS			6
4"	A10-40SS	/ 4 F O A N C	Stainless Steel	4GV, 4MV, 4MK
4"	A10-60SS	6" 150 lb. ANSI		
3" XP	A10-30B	411.450.11451.01		3XWC, 3SDX, 3GVX, 3MVX, 3MKX
4" XP	A10-40B	4" 150 lb. ANSI	Carbon Steel	4XWC, 4XWN, 4SDX, 4GVX, 4MVX, 4MKX
4" XP	A10-60B	6" 150 lb. ANSI]	4XWC, 4XWN, 4XD, 4SDX, 4GVX, 4MVX, 4MKX

^{*} For 6MK units, see Conery base elbow CBE6060.



Xylem, Inc.

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www.xyleminc.com/brands/centripro

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Wastewater Pumps Dewatering, Effluent and Sewage

INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS



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Owner's Information

Pump Model Nur	mber:						
Pump Serial Number:							
Control Model Number:							
Dealer:							
Dealer Phone No	•						
Date of Purchase:Installation:							
Current Readings		-	L2-3	L3-1			
Amps:	Volte.						

SAFETY INSTRUCTIONS

TO AVOID SERIOUS OR FATAL PERSONAL **INJURY OR MAJOR PROPERTY DAMAGE, READ** AND FOLLOW ALL SAFETY INSTRUCTIONS IN MANUAL AND ON PUMP.

THIS MANUAL IS INTENDED TO ASSIST IN THE **INSTALLATION AND OPERATION OF THIS UNIT** AND MUST BE KEPT WITH THE PUMP.



This is a SAFETY ALERT SYMBOL. When you see this symbol on the pump or in the manual, look for one of the following signal words and be alert to the potential for personal injury or property damage.

↑ DANGER

Warns of hazards that WILL cause serious personal injury, death or major property damage.

▲ WARNING

Warns of hazards that CAN cause serious personal injury, death or major property damage.

▲ CAUTION

Warns of hazards that CAN cause personal injury or property damage.

NOTICE: INDICATES SPECIAL INSTRUCTIONS WHICH ARE VERY IMPORTANT AND MUST BE FOLLOWED.

THOROUGHLY REVIEW ALL INSTRUCTIONS AND WARNINGS PRIOR TO PERFORMING ANY WORK ON THIS PUMP.

MAINTAIN ALL SAFETY DECALS.

A WARNING All electrical work must be performed by a qualified technician. Always follow the National Electrical Code (NEC), or the Canadian Electrical Code, as well as all local, state and provincial codes. Code questions should be directed to your local electrical inspector. Failure to follow electrical codes and OSHA safety standards may result in personal injury or equipment damage. Failure to follow manufacturer's installation instructions may result in electrical shock, fire hazard, personal injury or death, damaged equipment, provide unsatisfactory performance, and may void manufacturer's warranty.

▲ WARNING Standard units are not designed for use in swimming pools, open bodies of water, hazardous liquids, or where flammable gases exist. These fluids and gases may be present in containment areas. Tank or wetwell must be vented per local codes.

Only pumps specifically Listed for Class 1, Division 1 are allowable in hazardous liquids and where flammable gases may exist. See specific pump catalog bulletins or pump nameplate for all agency Listings.

▲ WARNING

Disconnect and lockout electrical power before installing or servicing any electrical equipment. Many pumps are equipped

with automatic thermal overload protection which may allow an overheated pump to restart unexpectedly.

All three phase (3Ø) control panels for submersible pumps must provide Class 10, quick-trip, overload protec-

tion.

PRE-INSTALLATION CHECKS

Open all cartons and inspect for shipping damage. Report any damage to your supplier or shipping carrier immediately.

Important: Always verify that the pump nameplate Amps, Voltage, Phase and HP ratings match your control panel and power supply.

Many of our sewage pumps are oil-filled. If there are any signs of oil leakage or if the unit has been stored for an extended period check the oil level in the motor dome and the seal housing, if so equipped.

Check the motor cover oil level through the pipe plug on top of the unit. The motor chamber oil should just cover the motor. Do not overfill, leave room for expansion!

To check the seal housing oil level, where used, lay the unit on its side with the fill plug at 12 o'clock. Remove the plug. The oil should be within ½" (13mm) of the top. If low, refill with an ASTM 150 turbine oil. Replace the plug.

Oil is available in 5 gallon cans through our distributors. You can also source oil locally at motor repair shops. Typical oil brands are: Shell Turbo 32, Sunoco Sunvis 932, Texaco Regal R&O 32, Exxon Nuto 32 and Mobil DTE Light.

Check the strain relief nut on power cable strain assemblies. Power cables should be torqued to 75 in. lbs. for #16 cables and 80 in. lbs. for all other cable assemblies. Seal/heat sensor cables, where used, should be torqued to 75 in. lbs.

Warranty does not cover damage caused by connecting pumps and controls to an incorrect power source (voltage/phase supply).

Record the model numbers and serial numbers from the pumps and control panel on the front of this instruction manual for future reference. Give it to the owner or affix it to the control panel when finished with the installation.

LIFTING OF PUMP



DO NOT LIFT, CARRY OR HANG PUMP BY THE ELECTRICAL CABLES. DAMAGE TO THE **ELECTRICAL CABLES CAN CAUSE** SHOCK, BURNS OR DEATH.

Lift the pump with an adequately sized chain or cable attached to the lifting eye bolt. DO NOT damage electrical and sensor cables while raising and lowering unit.

OPTIONAL GUIDE RAIL OR LIFT-OUT SYSTEM

In many effluent and sewage basins or lift stations it is advisable to install the pump on a guide rail system or on a lift-out adapter to facilitate installation and removal for inspection and/or service. Most codes do not allow personnel to enter a wetwell without the correct protective equipment and training. Guide rails are designed to allow easy removal of the pump without the need for entry into the wetwell or need to disturb piping. The guide rail or liftout adapter should locate the pump opposite the influent

opening preventing stagnate areas where solids can settle. The basin or pit must be capable of supporting the weight of the pump and guide rail. The pit floor must be flat.

NOTICE: FOLLOW THE INSTRUCTIONS THAT ARE PROVIDED WITH THE GUIDE RAIL ASSEMBLY.

PIPING

Discharge piping should be no smaller than the pump discharge diameter and kept as short as possible, avoiding unnecessary fittings to minimize friction losses.

Install an adequately sized check valve matched to the solids handling capability of the pump to prevent fluid backflow. Backflow can allow the pump to "turbine" backwards and may cause premature seal and/or bearing wear. If the pump is turning backwards when it is called on to start the increased torque may cause damage to the pump motor and/or motor shaft and some single-phase pumps may actually run backwards.

Install an adequately sized gate valve AFTER the check valve for pump, plumbing and check valve maintenance.

Important – Before pump installation. Drill a 3/16" (4.8mm) relief hole in the discharge pipe. It should be located within the wetwell, 2" (51mm) above the pump discharge but below the check valve. The relief hole allows any air to escape from the casing. Allowing liquid into the casing will insure that the pump can start when the liquid level rises. Unless a relief hole is provided, a bottom intake pump could "air lock" and will not pump water even though the impeller turns.

All piping must be adequately supported, so as not to impart any piping strain or loads on the pump.

The pit access cover must be of sufficient size to allow for inspection, maintenance and crane or hoist service.

WIRING AND GROUNDING

Important notice: Read Safety Instructions before proceeding with any wiring.



Use only stranded copper wire to pump/motor and ground. The ground wire must be at least as large as the power supply wires. Wires should be color coded for ease of maintenance and troubleshooting.



Install wire and ground according to the National Electrical Code (NEC), or the Canadian Electrical Code, as well as all local, state and provincial codes.



Install an all leg disconnect switch where required by code.



Disconnect and lockout electrical power before performing any service or installation.



The electrical supply voltage and phase must match all equipment requirements. Incorrect voltage or phase can cause fire, motor and control damage, and voids the warranty.



All splices must be waterproof. If using splice kits follow manufacturer's instructions.

⚠ WARNING

Select the correct type and NEMA grade junction box for the application and location. The junction box must insure dry, safe wiring connections.



Seal all controls from gases present which may damage electrical components.

AWARNING

Hazardous voltage

FAILURE TO PERMANENTLY GROUND THE PUMP, MOTOR AND **CONTROLS BEFORE CONNECTING** TO POWER CAN CAUSE SHOCK, BURNS OR DEATH.

SELECTING AND WIRING PUMP CONTROL PANELS AND SWITCHES

FLOAT SWITCH TYPES

There are two basic float switch designs; single-action and wide-angle. Single-action switches operate over a range of 15° so they open and close quickly. Wide-angle floats operate over a 90° swing with the tether length between the float body and the pivot point controlling the On-Off range. The design determines how many floats are required with different systems or controls.

Floats may be normally open (NO) for pump down applications or to empty a tank. Normally closed (NC) switches are used to pump up or to fill a tank.

A single-action control switch may be used only with a control panel, never direct connected to a pump.

The wide-angle, pump down switches may be used as direct connected pump switches or as control switches.

SETTING THE FLOAT SWITCHES

There are no absolute rules for where to set the float switches, it varies from job to job.

Suggested Rules to Follow: All floats should be set below the Inlet pipe!

Off Float: Best: set so the water level is always above the top of the pump (motor dome). Next Best: set so the water level is not more than 6" below the top of the pump.

On Float: set so the volume of water between the On and Off floats allows pumps of $1\frac{1}{2}$ HP and under to operate for 1 minute minimum. Two (2) HP and larger pumps should run a minimum of 2 minutes. Basin literature states the gallons of storage per inch of basin height.

Lag/Alarm Float(s): should be staggered above the Off and On floats. Try to use most of the available storage provided by the basin, save some space for reserve storage capacity. See Diagrams and Charts in Float Switch Chart Section.

PANEL WIRING DIAGRAMS

Our control panels are shipped with instructions and wiring diagrams. Use those instructions in conjunction with this IOM. Electrical installation should be performed only by qualified technicians. Any problem or questions pertaining to another brand control must be referred to that control supplier or manufacturer. Our technical people have no technical schematics or trouble shooting information for other companies' controls.

ALARMS

We recommend the installation of an alarm on all Wastewater pump installations. Many standard control panels come equipped with alarm circuits. If a control panel is not used, a stand alone high liquid level alarm is available. The alarm alerts the owner of a high liquid level in the system so they can contact the appropriate service personnel to investigate the situation.

SINGLE PHASE PUMPS

Single phase (1 \varnothing) pumps may be operated using a piggyback or hard wired float switch, a contactor, or a Simplex or Duplex control panel. *See Figures 1, 2 and 5*.

All $^{1}/_{3}$ and $^{1}/_{2}$ HP, 115 or 230 volt pumps, and some $^{3}/_{4}$ and 1 HP pumps, are supplied with plug style power cords. They may be plugged into piggyback float switches for simple installations. It is allowable to remove the plugs in order to hardwire or connect to a Simplex or Duplex controller. Removing the plug neither voids the warranty nor violates the agency Listings. *See Figure 5*.



PLUG-CONNECTED UNITS MUST BE CONNECTED TO A PROPERLY GROUNDED, GROUNDING TYPE RECEPTACLE.

ON NON-PLUG UNITS, DO NOT REMOVE CORD AND STRAIN RELIEF. DO NOT CONNECT CONDUIT TO PUMP.

Pumps with bare lead power cords can be hard-wired to a float switch, wired to a 1Ø contactor, a Simplex controller or a Duplex controller. Always verify that the float switch is rated for the maximum run amperage, maximum starting amperage, and the HP rating on the pump. Single-phase wastewater pumps contain on-winding overloads, unless noted on the pump nameplate. *See Figures 1 and 2*.

THREE PHASE PUMPS:

As a Minimum a 3Ø pump requires a 3 pole circuit breaker/fused circuit, an across the line magnetic starter rated for the pump HP, and ambient compensated Quick Trip Class 10 overloads.

SINGLE AND THREE PHASE CONTROL PANELS:

Control panels are available as Simplex (controls 1 pump) or Duplex (controls 2 pumps). Our standard SES Series Panels are available with many standard features and can be built with our most popular options. We also custom build panels which offer many more design options than the SES panels. Custom control panels are available in many different configurations. Custom panel quote requests may be forwarded to Customer Service through any authorized distributor.

Our "SES" Duplex panels feature a solid-state printed circuit board design with standard high level alarm circuits. Other standard features are: an auxiliary dry alarm contact for signaling a remote alarm and float switch position indicator lights. Our 3Ø panels have built-in, adjustable, Class 10 overloads. The adjustable overloads on all our 3Ø panels mean less labor for the installer and no need to order specific overloads. Most SES panels are in stock for immediate delivery.

On pumps equipped with seal fail and/or heat (high temperature) sensors it is recommended that you use our control panel with the appropriate options. The pump sensors do not function without a seal fail relay or terminal connection in the control panel and a warning device such as a bell, horn or light.

Seal Failure Circuit - Some dual seal pumps are equipped with a standard, built-in seal failure circuit, which may also be called a moisture detection circuit. This circuit must be connected to a control panel with an optional seal fail relay. The panel must be special ordered with the seal fail relay and alarm. There are also stand alone seal fail panels such as the A4-3 or A4-4 available as standard items. The pumps

can be identified by an extra control cable exiting the motor cover. The cable contains two wires, a black wire, connects to panel "terminal" going to "probe"; and a white wire, connects to the panel "terminal" going to the relay ground. Do not connect to the panel ground screw. Follow the wiring instructions supplied with the panel.

Heat Sensor and Seal Failure Circuit - Some pumps are equipped with a seal fail and normally closed, on-winding high temperature thermostats (heat sensors). The pumps have a control cable with five (5) leads, black (P1) and white (P2) for the seal fail circuit and red (W1) and orange (W2) for the high temperature circuit. Grean lead is ground. Connect the high temperature (heat sensor) circuit to the panel terminal strip as indicated on the panel drawing using the red and orange wires. The high temperature panel circuit is also an optional item which you must specifically order when you order your control panel. The high temperature circuit is different from the Class 10 overloads which are always required on three phase pumps. Follow the wiring instructions supplied with the panel.

*4NS NOTE: Call Technical support for wiring of 4NS/4XD/4XWS/4DWC/2GA/1GA/15GDS/20GDS.

INSTALLATION

Connect the pump(s) to the guide rail pump adapters or to the discharge piping. Slide rail bases should be anchored to the wetwell floor.

Complete all wiring per the control panel wiring diagrams and NEC, Canadian, state, provincial and/or local codes. This a good time to check for proper rotation of the motors/impellers.



DO NOT PLACE HANDS IN PUMP SUCTION WHILE CHECKING MOTOR ROTATION. TO DO SO WILL CAUSE SEVERE PERSONAL INJURY.

Always verify correct rotation. Correct rotation is indicated on the pump casing. Three phase motors are reversible. It is allowable to bump or jog the motor for a few seconds to check impeller rotation. It is easier to check rotation before installing the pump. Switch any two power leads to reverse rotation.

Lower the pump(s) into the wetwell.

Check to insure that the floats will operate freely and not contact the piping.

OPERATION

Once the piping connections are made and checked you can run the pumps.

Piggyback Switch Operation – Plug the piggyback switch into a dedicated grounded outlet and then plug the pump into the switch. Test the pump by filling the wetwell until the pump goes On. If the pumps run but fail to pump, they are probably air locked, drill the relief holes per the instructions in the Piping Section.

Check the operating range to insure a minimum one minute run time and that the pump goes Off in the correct position.

Control Panel Operation – Fill the wetwell with clear water.

Use the pump H-O-A (Hand-Off-Automatic) switches in Hand to test the pumps. If they operate well in Hand proceed to test Automatic operation. If the pumps run but fail to pump, they are probably air locked, drill the relief holes per the instructions in the Piping Section.

Place Control Panel switch(es) in Automatic position and thoroughly test the operation of the ON, OFF, and Alarm floats by filling the wetwell with clear water. **Important:** Failure to provide a Neutral from the power supply to a 1Ø, 230 volt Control Panel will not allow the panel control circuit to operate. The Neutral is necessary to complete the 115 volt control circuit.

Check voltage and amperage and record the data on the front of this manual for future reference. Compare the amperage readings to the pump nameplate maximum amperage. If higher than nameplate amperage investigate cause.

Operating the pump off the curve, i.e. with too little head or with high or low voltage will increase amperage. The motor will operate properly with voltage not more than 10% above or below pump nameplate ratings. Performance within this range will not necessarily be the same as the published performance at the exact rated nameplate frequency and voltage. Correct the problem before proceeding. Three phase unbalance is also a possible cause. See Three Phase Power Unbalance and follow the instructions.

Reset the Alarm circuit, place pump switch(es) in the Automatic position and Control Switch in ON position. The system is now ready for automatic operation.

Explain the operation of the pumps, controls and alarms to the end user. Leave the paperwork with the owner or at the control panel if in a dry, secure location.

FLOAT SWITCH AND PANEL CHART

The purpose of this chart is to show the required switch quantities and the function of each switch in a typical wastewater system. The quantities required vary depending on the switch type, single-action or wide-angle. Switch quantities also vary by panel type: simplex with and without alarms, and duplex with alarms.

Duplex Panels using single-action switches:

Three Float Panel Wiring

SW1	Bottom	Pumps Off
SW2	Middle	1st Pump On

SW3 Top 2nd Pump & Alarm On

Four Float Panel Wiring 2

SW1	Bottom	Pumps Off
SW2	2nd	1st Pump On
SW3	3rd	2nd Pump On
SW4	Top	Alarm On

Duplex Panels using wide-angle switches:

Three Float Panel Wiring

		_
SW1	Bottom	1st Pump On/Both Off
SW2	Top	2nd Pump & Alarm On

Four Float Panel Wiring

SW1	Bottom	1st Pump On/Both Off
SW2	Middle	2nd Pump On
SW3	Top	Alarm On

Simplex Panel using single-action switches:

Simplex Panel with Alarm ①

SW1	Bottom	Pump Off
SW2	Middle	Pump On
	CW/3	Top Marm O

SW3 Top Alarm On/Off

Simplex Panel with No Alarm

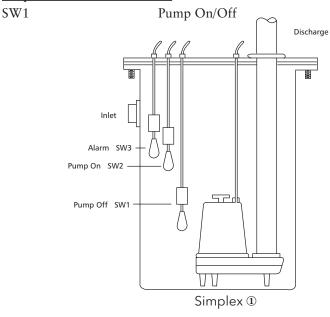
SW1	Bottom	Pump Off
SW2	Top	Pump On

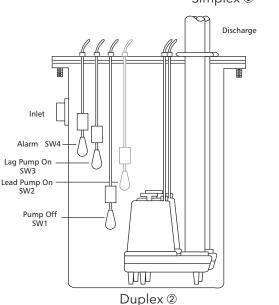
Simplex Panel using wide-angle switches:

Simplex Panel with Alarm

SW1 Bottom Pump On/Off SW2 Top Alarm On/Off

Simplex Panel with No Alarm





A full three phase supply consisting of three individual transformers or one three phase transformer is recommended. "Open" delta or wye connections using only two transformers can be used, but are more likely to cause poor performance, overload tripping or early motor failure due to current unbalance.

Check the current in each of the three motor leads and calculate the current unbalance as explained below.

If the current unbalance is 2% or less, leave the leads as connected.

If the current unbalance is more than 2%, current readings should be checked on each leg using each of the three possible hook-ups. Roll the motor leads across the starter in the same direction to prevent motor reversal.

To calculate percent of current unbalance:

A. Add the three line amp values together.

- B. Divide the sum by three, yielding average current.
- C. Pick the amp value which is furthest from the average current (either high or low).
- D. Determine the difference between this amp value (furthest from average) and the average.
- E. Divide the difference by the average. Multiply the result by 100 to determine percent of unbalance.

Current unbalance should not exceed 5% at service factor load or 10% at rated input load. If the unbalance cannot be corrected by rolling leads, the source of the unbalance must be located and corrected. If, on the three possible hookups, the leg farthest from the average stays on the same power lead, most of the unbalance is coming from the power source.

Contact your local power company to resolve the imbalance.

		Hookup	1	ŀ	Hookup	2		Hookup :	3
Starter Termina	ıls L1	L2	L3	L1	L2	L3	L1	L2	L3
	$\frac{\perp}{\top}$	† †	<u></u>	<u> </u>	$\frac{\perp}{\top}$	T T	T T	T T	\perp
Motor Leads	R	В	W	W	R	В	В	W	R
	Т3	T1	T2	T2	Т3	T1	T1	T2	Т3
Example:									
		-R = 51 a			V = 50 a			B = 50 a	
T1-B = 46 amps		T3-	R = 48 a	mps	T2-\	T2-W = 49 amps			
T2-W = <u>53</u> amps		T1-	T1-B = 52 amps		T3-R = 51 amps		mps		
Total = 150 amps		Total	Total = 150 amps		Total = 150 amps		mps		
$\div 3 = 50 \text{ amps}$			3 = 50 a			3 = 50 a	•		
	_	46 = 4 a	mps	_	- 48 = 2 amps		_	- 49 = 1 amps	
	4 ÷ 50	0.80 = 0.0	r 8%	2 ÷ 50	= .04 o	r 4%	1 ÷ 50	0 = .02 or	· 2%

INSULATION RESISTANCE READINGS

Normal Ohm and Megohm Values between all leads and ground

Condition of Motor and Leads	Ohm Value	Megohm Value
A new motor (without drop cable).	20,000,000 (or more)	20 (or more)
A used motor which can be reinstalled in well.	10,000,000 (or more)	10 (or more)
Motor in well. Readings are for drop cable plus		
New motor.	2,000,000 (or more)	2 (or more)
Motor in good condition.	500,000 - 2,000,000	.5 - 2
Insulation damage, locate and repair.	Less than 500,000	Less than .5

Insulation resistance varies very little with rating. Motors of all HP, voltage and phase ratings have similar values of insulation resistance.

Insulation resistance values above are based on readings taken with a megohmmeter with a 500V DC output. Readings may vary using a lower voltage ohmmeter, consult factory if readings are in question.

Engineering data for specific models may be found in your catalog and on our website (address is on the cover).

Control panel wiring diagrams are shipped with the control panels. Please use the control panel drawings in conjunction with this instruction manual to complete the wiring.

	PUMP C
Minir	num Submergence
Continuous Duty	Fully Submerged
Intermittent Duty	6" Below Top of Motor

OPERATION			
Maximu	ım Fluid Temperature		
Continuous Operation	104° F 40° C		
Intermittent Operation	140° F 60° C		

Pumpmaster and Pumpmaster Plus -Hard Wired

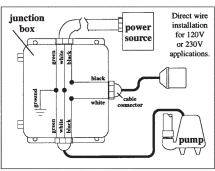
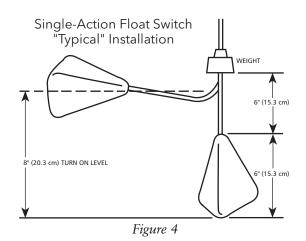


Figure 1



Double Float - Hard Wired

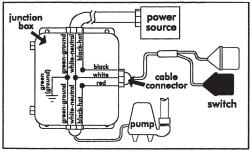


Figure 2

Wide-Angle Float Switch

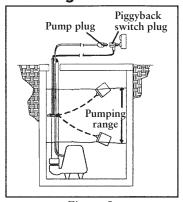


Figure 5

Determining Pumping Range

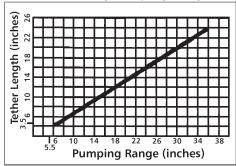


Figure 3

Three Phase Connection Diagram

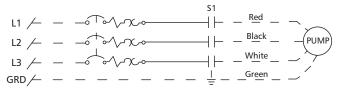
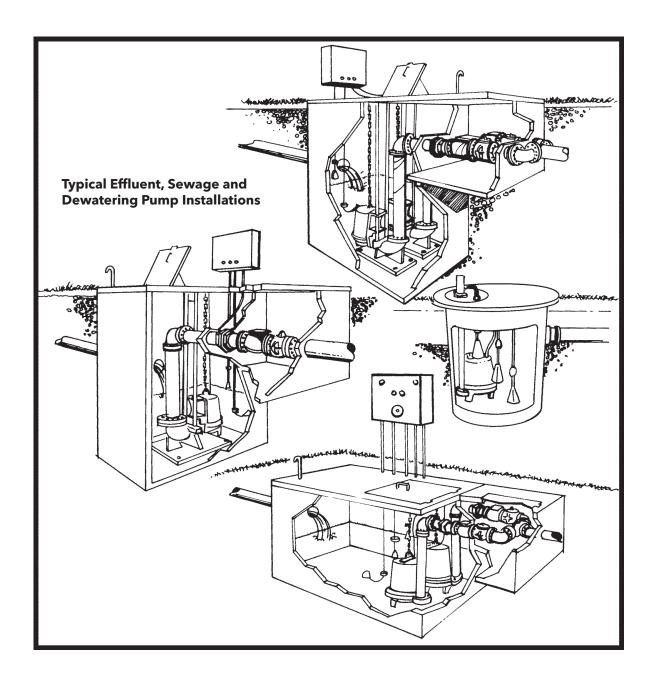


Figure 6

▲WARNING

Hazardous voltage FAILURE TO DISCONNECT AND LOCKOUT ELECTRICAL POWER BEFORE ATTEMPTING ANY SERVICE CAN CAUSE SHOCK, BURNS OR DEATH.

SYMPTOM	PROBABLE CAUSE	RECOMMENDED ACTION
MOTOR NOT RUNNING NOTE: If circuit breaker	Motor thermal protector tripped.	Allow motor to cool. Insure minimum pump submergence. Clear debris from casing and impeller.
"OPENS" repeatedly,	Open circuit breaker or blown fuse.	Determine cause, call a qualified electrician.
DO NOT reset. Call qualified electrician.	Pump impeller binding or jammed.	Check motor amp draw. If two or more times higher than listed on pump nameplate, impeller is locked,
a) Manual operation	Power cable is damaged.	motor bearings or shaft is damaged. Clear
	Inadequate electrical connection in control panel.	debris from casing and impeller, consult with dealer.
b) Automatic operation	No neutral wire connected to control panel.	Resistance between power leads and ground should read infinity. If any reading is incorrect, call a qualified electrician.
	Inadequate electrical connection in control panel.	Inspect control panel wiring. Call a qualified electrician.
NOTE: Check the pump in manual mode first to confirm operation. If pump	Defective liquid level switch.	With switch disconnected, check continuity while activating liquid level switch. Replace switch, as required.
operates, the automatic control or wiring is at fault. If pump does not operate,	Insufficient liquid level to activate controls.	Allow liquid level to rise 3" to 4" (76 mm - 101 mm) above turn-on level.
see above.	Liquid level cords tangled.	Untangle cords and insure free operation.
PUMP WILL NOT TURN OFF	Liquid level cords tangled.	Untangle cords and insure free operation.
	Pump is air locked.	Shut off pump for approximately one minute, then restart. Repeat until air lock clears. If air locking persists in a system with a check valve, a $\frac{3}{16}$ " (4.8 mm) hole may be drilled in the discharge pipe approximately 2" (51 mm) above the discharge connection.
	Influent flow is matching pump's discharge capacity.	Larger pump may be required.
LITTLE OR NO LIQUID DELIVERED BY PUMP	Check valve installed backwards, plugged or stuck closed.	Check flow arrow on valve and check valve operation.
	Excessive system head.	Consult with dealer.
	Pump inlet plugged.	Inspect and clear as required.
	Improper voltage or wired incorrectly.	Check pump rotation, voltage and wiring. Consult with qualified electrician.
	Pump is air locked.	See recommended action, above.
	Impeller is worn or damaged.	Inspect impeller, replace as required.
	Liquid level controls defective or improperly positioned.	Inspect, readjust or replace as required.
PUMP CYCLES	Discharge check valve inoperative.	Inspect, repair or replace as required.
CONSTANTLY	Sewage containment area too small.	Consult with dealer.
	Liquid level controls defective or improperly positioned.	Inspect, readjust or replace as required.
	Influent excessive for this size pump.	Consult with dealer.



GOULDS WATER TECHNOLOGY LIMITED WARRANTY

This warranty applies to all water systems pumps manufactured by Goulds Water Technology.

Any part or parts found to be defective within the warranty period shall be replaced at no charge to the dealer during the warranty period. The warranty period shall exist for a period of twelve (12) months from date of installation or eighteen (18) months from date of manufacture, whichever period is shorter.

A dealer who believes that a warranty claim exists must contact the authorized Goulds Water Technology distributor from whom the pump was purchased and furnish complete details regarding the claim. The distributor is authorized to adjust any warranty claims utilizing the Goulds Water Technology Customer Service Department.

The warranty excludes:

- (a) Labor, transportation and related costs incurred by the dealer;
- (b) Reinstallation costs of repaired equipment;
- (c) Reinstallation costs of replacement equipment;
- (d) Consequential damages of any kind; and,
- (e) Reimbursement for loss caused by interruption of service.

For purposes of this warranty, the following terms have these definitions:

- (1) "Distributor" means any individual, partnership, corporation, association, or other legal relationship that stands between Goulds Water Technology and the dealer in purchases, consignments or contracts for sale of the subject pumps.
- (2) "Dealer" means any individual, partnership, corporation, association, or other legal relationship which engages in the business of selling or leasing pumps to customers.
- (3) "Customer" means any entity who buys or leases the subject pumps from a dealer. The "customer" may mean an individual, partnership, corporation, limited liability company, association or other legal entity which may engage in any type of business.

THIS WARRANTY EXTENDS TO THE DEALER ONLY.



Xylem, Inc. 2881 East Bayard Street Ext., Suite A Seneca Falls, NY 13148 Phone: (866) 325-4210

Fax: (888) 322-5877

www.xyleminc.com/brands/gouldswatertechnology

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Centrifugal Pumps





Features

- Pump Design Compact, close coupled
- Teflon Seal Type 9 available
- Flush Options Recirculating

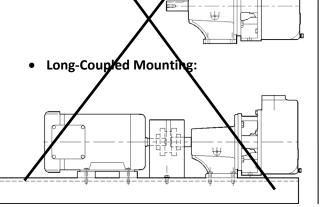
Applications

- Chemical Sump Pumps
- Ground Water Remediation
- Waste Water Treatment
- Pumping Solvents
- Deionized Water
- Chemical Process
- · Agricultural Chemicals
- Dewatering

Optional Configurations

• Air Motor: Up to 1-1/2 HP

Power Frame Mounting:



SP150 (Self Priming)

Pump Volute / Impeller Materials

• SP150 (AI) — Cast Iron / Cast Iron SP150 (SF) — Cast Iron / 316SS

SP150 (SS) – 316SS / 316SS

Standard Specifications

• SP150 Discharge 1-1/2" FNPT, Suction 1-1/2" FNPT

Maximum Impeller Diameter: 4.75"

Maximum Impeller Vane Height: 0.50"

Stub Shaft: 5/8" 316SS

Motor: NEMA C Face (Multiple enclosures available)

· Mechanical Seal:

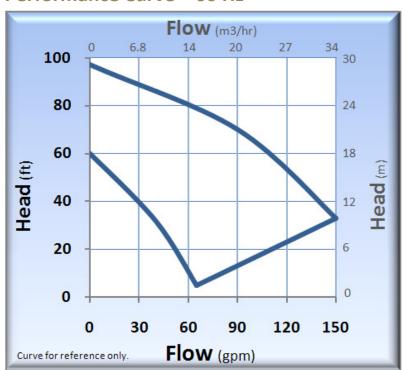
Single, 3/4" Type 21 Buna, Carbon vs. Ceramic (AI, SF)

▶ Single, 3/4" Type 21 Viton, Carbon vs. Ceramic (SS)

Note: Additional seal options available

Gasket: Syn. Fiber (AI, SF) and PTFE (SS)

Performance Curve - 60 Hz



Rev. Date: May 2009

SP150

Technical Information			
Max Flow		150 GPM (27 m3/hr)	
Max Head		97 feet (46 m)	
Min. Flow		10 GPM (2.3 m3/hr)	
Max Solid	Size	0.060" (1.5 mm)	
Max Working Pressure	(Type 8 Seal) (Type 9 Seal) (Type 21 Seal)	325 PSI (22.4 bar) 350 PSI (24.1 bar) 150 PSI (10.3 bar)	
Max Temp.		300°F (149°C)*	

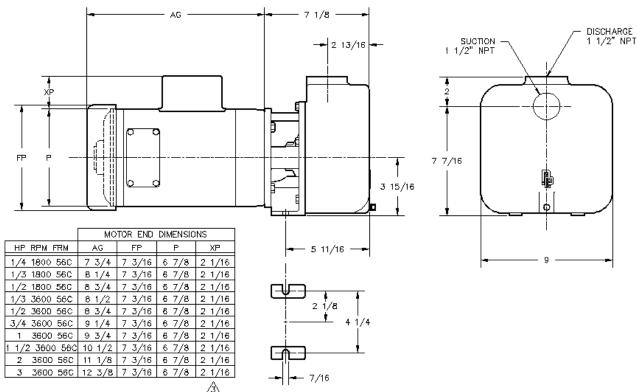
^{*} Temperature limits are based on standard seal and gasket materials, and will vary according to the liquid being pumped.

Materials o Construction			
SP150	Al	SF	SS
Volute / Diffuser	Cast Iron	Cast Iron	316SS
Impeller	Cast Iron	316SS	316SS
Bracket	Cast Iron	Cast Iron	316SS
Gaskets	Syn. Fiber	Syn. Fiber	Teflon
Fasteners	316SS	316SS	316SS

Priming Times (Minutes: Seconds)				
Impeller Size	5 ft.	10 ft.	15 ft.	20 ft.
4.25/.07	1:30	3:45	6:30	12:25
4.63/.12	1:00	2:25	5:25	10:00
4.75/.25	0:38	1:15	2:48	6:15
4.75/.50	0:20	0:35	1:05	2:25

Notes: For all other impeller sizes, interpolate to achieve approximate times.

Dimensions (SP150)



NOTE:

- 1. MOTOR DIMENSIONS WILL VARY BY MODEL AND MAKE, DIMENSIONS ARE TO BE USED FOR REFERENCE ONLY.
- 2. ALL DIMENSIONS ARE ROUNDED TO THE
- NEAREST 1/8 INCH.

 3. DIMENSION "XP" APPLIES TO SINGLE PHASE MOTORS ONLY.

PRICE PUMP CO.

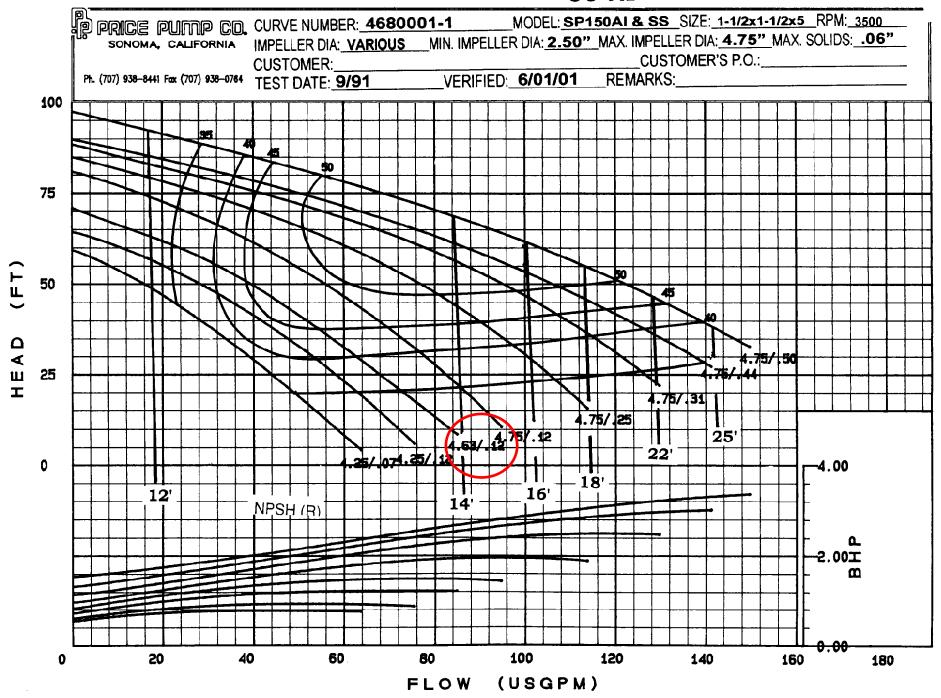
Contact factory for special pump configurations, same day, and next day delivery options.

21775 Eighth Street East Sonoma, CA 95476-0329 MAIN (707) 938-8441 TOLL FREE (800) 345-7867 (707) 938-0764 **FAX** E-mail: sales@pricepump.com

Website: www.pricepump.com



Rev. Date: May 2009





Price® Pump Co.

INSTALLATION, OPERATING AND MAINTENANCE MANUAL

TYPE SP CENTRIFUGAL PUMPS

MODELS: SP 150

PLEASE FILL IN FROM PUMP NAMEPLATE

Pump Model	
BOM. No	
Serial No.	

Price® Pump Company 21775 8th. Street East Sonoma, CA 95476

Tel: 707-938-8441 Fax 707-938-0764

Email: sales@pricepump.com

RETAIN MANUAL FOR REFERENCE

Congratulations

You are now the owner of a Price® Pump Co. Centrifugal Pump. This pump was carefully inspected and subjected to final performance tests before being released for shipment. In order to achieve maximum performance and reliability, please follow the simple instructions in this manual.

RECOMMENDED PRECAUTIONS

- 1. For satisfactory operation and safety, maximum system pressure must not exceed 350 psi* (24.6kg/sq cm).
- 2. For satisfactory operation and safety, maximum fluid temperature must not exceed 300°F* (121°C).
- 3. No modifications, additions or deletions should be made to the pump without prior approval of the factory.
- 4. Drain pump completely and flush with water before servicing a pump handling volatile or harmful liquids.

READ CAREFULLY THE CAUTION BELOW

The performance of your Price® Pump Co. Centrifugal Pump is based on clean, room temperature, water with suction conditions as shown on the performance curves. If used to pump liquids other than water, pump performance may differ from rated performance based on the different specific gravity, temperature, viscosity, etc. of the liquid being pumped. A standard pump, however, may not be safe for pumping all types of liquids, such as toxic, volatile or chemical liquids, or liquids under extreme temperatures or pressures.

Please consult Price® Pump Co. technical specifications as well as local codes and general references to determine the appropriate pump for your particular application. Since it is impossible for us to anticipate every application of a Price® Centrifugal pump, if you plan to use the pump for a non-water application, contact Price® Pump Co. beforehand to determine whether such application may be appropriate and safe under the operating conditions. Failure to do so could result in property damage or personal harm.

* Depends on seal materials and seal type

Visit our website for product information and technical support www.pricepump.com

INSTALLATION / OPERATING INSTRUCTIONS CENTRIFUGAL PUMPS

Warning

Before installing, repairing or performing maintenance on this pump, read these instructions completely.

Disconnect power to pump before servicing to avoid dangerous or fatal electrical shock.

Match supply voltage and frequency to motor nameplate values. Incorrect voltage can cause fire or serious motor damage and void warranty.

Ground motor before connection to electrical power supply! Failure to ground motor can cause severe or fatal electrical shock!

Do not ground to gas supply line!

Before disassem bling pump, be certain all liquid has been removed. If pump was used to pump hazardous or toxic fluid, it must be decontaminated prior to disassem bly.

Close Coupled Motor Pumps

It is suggested that these pumps be firmly bolted to a level surface. Adequate air movement around motor will help prevent overheating.

Do not over tighten inlet and outlet piping or volute may be damaged.

Power Frame Mounted Pumps

Power Frame mounted pumps must be mounted on a rigid base that will not warp or flex. Each pump must be mounted such that the pump shaft centerline is in-line with the driver shaft centerline. Pads and/or shims will be required on the pump, the driver or both to insure proper alignment. The two shafts should not touch each other (end to end) and the distance between them depends on the coupling used to connect them.

M isalignment will cause vibration, bearing failure and void warranty. Pumps are rough aligned at the factory but must be realigned after shipment and installation.

Pulley driven pump must have pulleys inline and proper belt tightness practices followed.

Direction of Rotation

Note: Motor shaft rotation is viewed from the suction end of pump. A rotational arrow is shown on the front of the pump volute casing.
Incorrect rotation can cause pump damage, failure or reduced performance, voiding warranty. It is best to check rotation by momentarily energizing or jogging the motor prior to filling pump with liquid.

Warning! Do not operate pump without liquid as damage may result to the pump internal wear surfaces.

Plum bing

All piping needs to be supported independently of the pump. Piping connections should not exert any stress on the pump volute or fittings.

Suction Piping (Inlet)

(Horizontal Pumps)

Suction line must provide adequate suction pressure and even (Laminar) liquid flow for proper pump operation. Air, entrapped in the suction line due to leaks or improper piping design, may cause the pump to lose prime. Non-priming pumps must have their suction 'flooded' at start up (see datasheets for minim um NPSHR). Also, the suction line must provide sufficient pressure (NPSH) and even flow to pump inlet to prevent pump cavitation. The suction pipe entering the pump should be straight and a minimum length of 5 times and preferably 10 times the pump inlet diam eter. Elbows, fittings or valves installed close to the pump in let can disrupt liquid flow and cause cavitation. Suction lines must be at least the same diam eter as the pump inlet or larger if possible.

Price Pump Company recommends against using foot valves in the suction line to maintain liquid in the pump when it's not operating. If foot valves are used, due to suction lift conditions, they must be properly maintained to avoid

leaks resulting from wear or fouling. Suction piping must be designed to prevent vapor from being trapped in high spots in the piping. This condition may cause the pump to vapor lock.

Discharge Piping (Outlet)

To control flow and discharge head, it is advisable to install a valve (globe, ball, or other adjustable and non-leak type) in the discharge line adjacent to the pump. The valve may be closed during system repairs to prevent backflow. By installing a check valve in the discharge line, backflow can also be prevented during maintenance or during periods of pump stoppage.

Operation

All centrifugal pumps must be filled with liquid prior to start up. It is suggested that during initial start up the discharge valve be closed and then opened as the motor reaches full rpm's. If pump does not build up pressure as motor speed increases, shut down and make sure that liquid flow into pump is not restricted (see "Troubleshooting").

Note: A centrifugal pumps flow rate and head (pressure) will vary with the amount of resistance (pipe friction and flow restrictions) in the discharge line. As the valve on the discharge line opens, the flow rate and motor amperes draw will increase and head (pressure) will decrease. As the valve on the discharge line is closed, the flow rate and amperes draw will decrease and the head (pressure) will increase.

If resistance in the discharge line is not sufficient, the pump will operate at a condition of maximum flow, sometimes called "end of curve" perform ance. Maximum horse-power is required to operate at this point and motor overload may result. If excessive amperes draw and motor overload is occurring, reduce the system flow rate by installing a valve or orifice in the discharge line to control (restrict) the pumps flow rate. Alternatively, reduce pump head by trim ming impeller to a smaller diameter.

Consult Price Pump or a local Price Pump distributor for assistance.

www.appsupport@pricepump.com

TROUBLESHOOTING

1. Pump fails to build head pressure:

Check for:

- a. Pump not primed.
- b. Incorrect pump rotation.
- c. Driver speed too low.
- d. Suction line restricted.
- e. Driver failure.
- f. Plugged or damaged impeller.
- g. Pump or impeller undersized.
- h. Pump cavitation.
- i. Improper im peller clearance.

2. Pump fails to provide enough flow rate.

Check for:

- a. System resistance too high.
- b. Pump undersized.
- c. Pump not primed.
- d. Driver speed too low.
- e. Poor suction conditions.
- f. Im proper impeller clearance.

3. Excessive noise or vibration during operation.

Check for:

- a. Motor bearing failing.
- b. Pump cavitation.
- c. Im proper impeller clearance.

4. Leaking mechanical seal.

Check for:

- a. Improper assembly.
- b. Worn or cracked seal faces.
- c. Abrasive material in fluid.
- d. Liquid flashing at seal faces (Fluid temperature too high).
- e. Seal pressure rating too low for the service.
- f. Chemical attack of seal components.
- g. Seal operated dry or with a liquid having poor lubricating properties.

5. Pump gradually loses pressure and head.

Check for:

- a. Increasing temperature causing cavitation or liquid vaporization.
- b. Driver failure.
- c. Suction lift too high.
- d. Air entering suction line.

6. Motor overheating.

Check for:

- a. Excessive flow and amp draw (Throttle discharge).
- b. Low voltage or frequency.
- c. Flow rate too low with resulting heat rise.
- d. Bearing failure.
- e. System temperature too high.

REPAIR AND MAINTENANCE

TYPE SP150 M AINTENANCE AND REPAIR

Before attempting any repairs under warranty, contact Distributor to obtain factory authorization. Repairs carried out without authorization may void warranty. Many causes of pump system failure are due to improper system design. Refer to the trouble shooting list in this manual before carrying out pump inspection.

DISASSEM BLY

- 1. Disconnect power source to motor.
- 2. Disconnect electrical connections tagging wires carefully to preserve correct rotation.
- 3. Remove pump and motor assembly to repair area.

 Observe position of all parts prior to disassembly. Note:

 Volute may be left in piping.
- 4. Remove bolts and remove volute from pump.
- 5. Remove impeller. Unscrew CCW. Secure pump shaft with locking type pliers.

Caution: Use caution not to damage pump shaft setscrews with locking type pliers.

- 6. Remove seal head from the shaft. Type 21: Slide from the shaft. Type 9: Loosen set screws and slide off.
- 7. Remove four motor bolts and remove bracket from motor.

8. Remove seal seat from bracket. Use wooden or plastic dowel to tamp the seat from the bracket.

REASSEM BLY

- Clean seat cavity of the bracket thoroughly.
- 2. Thoroughly clean pump shaft. Assure that the shaft is not grooved and that there is no evidence of pitting or fretting. Polish the shaft with extra fine emery cloth and clean the keyway.
- 3. Install the pump shaft onto the motor shaft, aligning setscrews of the pump shaft with the keyway of the motor shaft. Ensure all debris and burrs are removed from the motor shaft and that the slinger is in place.
- 4. For Type 21, 8, 9 seals:
 Place the bracket on a firm
 surface with the seat cavity
 (pump end) up. Then place a
 small amount of vegetable
 oil on the seat cup or o-ring
 seat. Place the seat in the
 seat cavity with the polished
 face up to ward the pump

- end. Evenly push seat into cavity with fingers then gently tap seat into place with a wooden dowel or plastic rod (1-1/8" outside diameter). To help ensure the seat is not damaged place the cardboard disk supplied with the seal over the seat face.
- 5. Place bracket on motor (aligning the base if applicable). Secure bracket with four motor bolts.
- 6. Pull pump shaft forward until shoulder of pump shaft contacts back of bracket and slightly snug one setscrew to hold shaft in place. Hold pump shaft with locking type pliers.

Caution: Use caution not to damage pump shaft setscrews with locking type pliers.

7. Install seal head assembly:

For Type 21 Seals:

a. Lubricate shaft and elastomer with vegetable oil.

REPAIR AND MAINTENANCE

- b. Install rotary seal head onto pump shaft and slide toward seat until carbon face touches seal seat.
- c. Install seal spring and retainer.
- d. Thread impeller onto pump shaft with #222 Loctite (or equivalent). Tighten impeller with screwdriver between impeller vanes.
- e. Remove locking type pliers and loosen pump shaft setscrew.
- f. Install new volute gasket and mount volute (with diffuser installed). Secure with bolts and tighten evenly.
- g. Slide pump shaft forward until impeller touches diffuser. Slide shaft back with a screwdriver .010"-.015" (approx. 1/64") Slide .010"-.015" feeler gauge between the impeller vane and the diffuser face. Tighten pump shaft setscrews. Rotate shaft by hand to ensure impeller does not rub against diffuser.

For Type 8 & 9 Seals:

- a. In stall impeller. Thread impeller onto pump shaft.
- b. Install new volute gasket and mount volute (with diffuser installed). Secure

- with bolts and tighten evenly.
- c. Slide pump shaft forward until impeller touches diffuser. Slide shaft back with a screwdriver .010"-.015" (approx. 1/64") Slide .010"-.015" feeler gauge between the impeller vane and the diffuser face. Tighten pump shaft setscrews. Rotate shaft by hand to ensure impeller does not rub against diffuser.
- d. Remove volute and impeller.
- e. Do not remove metal clips from seal head. Install seal head onto pump shaft sliding gently past shoulder of shaft. Slide seal head toward seat until carbon face contacts ceramic seat.

 Tighten seal head setscrews to pump shaft using short arm Allen wrench. Remove clips in seal head and discard.
- f. Reinstall impeller with #222 Loctite (or equivalent) and tighten securely.
- g. Reinstall new volute gasket and mount volute (with diffuser installed).
 Secure with bolts and tighten evenly.
- h. Rotate pump shaft by hand to ensure impeller does not rub against diffuser.

- 8. Return pump to installation, reconnect electric connections.
- 9. Start pump momentarily to observe shaft rotation. If rotation corresponds the rotation arrow pump may be put into service. If rotation is incorrect, switch any two leads on 3-phase motors. Check wiring diagram of motor for single phase rotation.
- 10. Remove top pipe plug if applicable) from the front of volute and prime pump thoroughly, making sure all air is purged.
- 11. Start pump allowing adequate time to purge all air from system. Observe any gauges flow meters, etc. to see of pump performs properly.

REPAIR AND MAINTENANCE

INSTALLING A PEO (PUMPEND ONLY)

- a. Place the bracket on a firm surface, loosen stub shaft setscrews and carefully remove shipping plug.
- b. Place motor in an upright position with motor shaft pointing upward. Make sure motor shaft and end bell flange are free of burrs and surfaces are clean.
- c. Align PEO stub shaft setscrews with motor shaft keyway and carefully slid the PEO onto the motor shaft until it sits firmly onto the motor end bell flange.
- d. Oriented the PEO's discharge port or base to preferred motor configuration while referencing the motors electrical box position.
- e. Install flange bolts and tighten. (Install pump base if applicable)
- f. Reposition pump back onto motor base.
- g. Refer to pump Reassembly Instructions and proceed to setting the impeller clearance.

Self Priming Installation Instructions

Attention to these instructions will assure trouble-free service from your Price® Self-Priming pump:

- Locate pump near source.
- Limit suction line lengths to less than 20' (6.1m).
- Suction pipe size should be same size as pump thread size.
- Avoid foot valves on suction line.
- Provide a small diameter air bleed line from discharge pipe to sump if the air is not able to freely vent out the discharge pipe.
- Minimum recommended flow rate: 10gpm
- Maximum solid size: 0.06"

Suction Lift Performance

Once a pump has been selected based on speed, flow and head, priming times may be determined using chart below.

Times Based on 3450 RPM

Priming time (minutes) at various Suction Lift (feet)

SP150 configuration - Cast iron and 316 stainless steel

Im peller O D / Vane Ht.	5'	10'	15'	20'
4.25/.07	1:30	3:45	6:30	12:25
4.63/.12	1:00	2:25	5:25	10:00
4.75/.25	0:38	1:15	2:48	6:15
4.75/.50	0:20	0:35	1:05	2:25

Note: Factors such as static lift distance, specific gravity and suction pipe size also have a direct bearing upon priming times.



SP 150 CI, CI/SF, SS Parts List

PRICE[®] PUMP CO.

SP plist.doc rev. 8

Key#	Description	Quantity	Cast Iron	316SS
Α.	Volute	1	0962	0967
B .	Impeller	1		
	Dia. / Vn			
	4.7550		3264-475A	3 272-475 A
	4.7544		3264-475B	3 272-475B
	4.7525		3264-475D	272-475D
	4.7512		3264-475E	3272-475E
	4.6312		3264-463E	3 272-4 63 E
	4.2512		3264-425E	3 272-4 25E
	4.2507		3264-425F	3 272-4 25 F
	Seal / Seat:	1		
C1.	Type 21		1112	0549
C2.	Type 9		0551	0551
	Seat pin f/ T9 seal not shown	1	0890	0890
D.	Diffuser	1	0963	0968
Ε.	Diffuser Gasket	1	0966 (syn. fiber)	0971(Teflon)
F.	Diffuser Bolts	3	0977	0977
G.	Volute Gasket	1	0965 (syn. fiber)	0970 (Teflon)
Н.	Bracket	1	0964	0969
J.	Volute Bolts	5	0911	0976
K .	Shaft w/ setscrews	1	0270-1	0270-1
M .	M otor Bolts	4	0588	0588
Ν.	1/8" Pipe Plug	1	0557	0559
Ρ.	Slinger	1	0522	0522
R1.	Motor Specify P/N			
R 2.	Power Frame		5478	5 4 7 8
R3.	Air Motor Specify P/N			
S	1-11x1/2 Pipe Plug (CI only)	1	0562	N/A

SP150 Repair Parts Kit

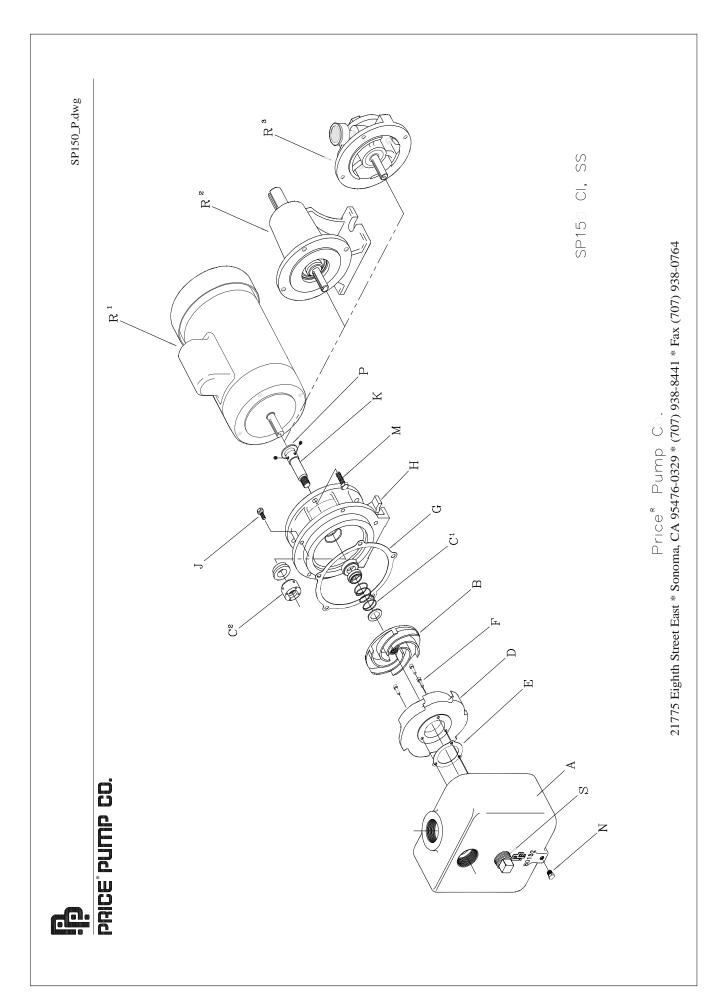
Repair Kits includes: Gasket, Shaft w/set screws and Slinger

All Iron - P/N 0987 Stainless Steel - P/N 0989

Note: Seal/seat must be ordered in addition to repair kit.

3/4" T.21 Buna for Cast Iron (std.), T.21 Fluorocarbon for SS (std.)

AI = All Iron SS = Stainless Steel SF = Stainless Fitted Vn = Vane Height



PRICE CENTRIFUGAL PUMP CAUTIONS & WARNINGS

- CAUTION: Price Pump centrifugal pumps must be operated above minimum flow rate to avoid damage.
- CAUTION: All Price Pump centrifugal pumps require the suction to be flooded.
- CAUTION: It is recommended that all piping connections to the pump be flexible.
- WARNNING: Verify chemical compatibility of the pump materials of construction with the fluid being pumped.
- WARNNING: Price centrifugal pumps are not designed for use in sanitary or food applications.
- CAUTION: Use only Price Pump original equipment factory replacement parts.
- WARNNING: Price pump fluid temperature limits must be observed. Maximum operating temperature is 300°F.
- CAUTION: The pump should be thoroughly flushed and drained before disassembly.
- CAUTION: For larger pump motor units, weight may exceed 65 1bs. (30 kg).

CAUTION: Maximum working pressure for seals:

0	Type 6 Seal	75 PSI (5.2 bar)
0	Type 6A Seal	75 PSI (5.2 bar)
0	Type 8 Seal	325 PSI (22.4 bar)
0	Type 9 Seal	350 PSI (24.1 bar)
0	Type 21 Seal	150 PSI (10.3 bar)
0	Type 2106 Seal	150 PSI (10.3 bar)

CAUTION: Maximum solid size by pump

0	HP75 / MS50	0.030 " (0.76 m m)
0	SP150	0.060 " (1.50 m m)
0	LT25	0.120" (3.05 m m)
0	F50/75/95	0.150 " (3.81 m m)
0	OH75	0.150 " (3.81 m m)
0	CD 100/150	0.150 " (3.81 m m)
0	CL150	0.150 " (3.81 m m)
0	RC200/300	0.380 " (9.60 m m)
0	XJ-JB100	0.120 " (3.05 m m)
0	XJ-JB150	0.250 " (6.40 m m)
0	XJ-JB200	0.440 " (11.2 m m)
0	XL-XT100	0.120 " (3.05 m m)
0	XL-XT150	0.250 " (6.40 m m)
0	XL-XT200	0.440 " (11.2 m m)

0	HP75 / MS50	0.5 GPM (1.9 LPM)
0	SP150	10 GPM (38 LPM)
0	LT25	0.5 GPM (1.9 LPM)
0	F50/75/95	5.0 GPM (19 LPM)
0	OH 75	7.0 GPM (26 LPM)
0	C D 1 00	12 GPM (45 LPM)
0	C D 150	25 GPM (94 LPM)
0	CL150	40 GPM (150 LPM)
0	R C 2 0 0	10 GPM (38 LPM)
0	R C 3 0 0	50 GPM (189 LPM)
0	X J - JB 150	20 GPM (75 LPM)
0	X J - JB 150	40 GPM (150 LPM)
0	X J - JB 2 0 0	90 GPM (340 LPM)
0	X L-X T 100	10 GPM (38 LPM)
0	X L-X T 150	35 GPM (132 LPM)
0	X L-X T 200	50 GPM (189 LPM)



GENERAL TERMS OF SALE

A. Seller's price is based on these sales terms and conditions. The agreement and inclusion of other or amended terms in this contract will result in a change (including increase) in Seller's price (as may be contained in any price books or quotations) to reflect such other or amended terms. This contract shall represent the final, complete and exclusive statement of the agreement between the parties and may not be modified, supplemented, explained or waived by parole evidence, any Terms and Conditions contained in Buyer's purchase order or request for quotation, any course of dealings between the parties, Seller's performance or delivery, or in any other way. The Terms and Conditions of this contract may only be modified or waived in a written document signed by an Officer of Seller. These terms are intended to cover all activity of Seller and Buyer hereunder, including sales and use of products, parts and work and all related matters (references to products include parts and references to work include construction, installation and start-up). Any reference by Seller to Buyer's specifications and similar requirements are only to describe the products and $% \left(1\right) =\left(1\right) \left(work covered hereby and no warranties or other terms therein shall have any force of effect. Any information provided by Seller including, but not limited to, suggestions as to specific equipment does not imply any guarantee of specific suitability and/or material compatibility in a particular application, since many factors outside the control of Seller may affect the suitability of products in a particular application. Catalogs, circulars, similar pamphlets and information contained on websites of the Seller are issued for general information purposes only and shall not be deemed to modify the

B. The agreement formed hereby and the language herein shall be construed and enforced under the Uniform Commercial Code as in effect in the State of California on the date hereof.

Any sales, use or other similar type taxes imposed on this sale or on this transaction and/or any import or export duties or fees as may be assessed or imposed on or as a result of deliveries under this transaction are not included in the price. Such taxes shall be billed separately to the Buyer Seller will accept a valid exemption certificate from the Buyer if applicable; however, if an exemption certificate previously accepted is not recognized by the governmental taxing authority involved and the Seller is required to pay the tax covered by such exemption certificate. Buyer agrees to promptly reimburse Seller for the taxes paid.

3. PERFORMANCE, INSPECTION AND ACCEPTANCE

A. Unless Seller specifically assumes installation, construction or start-up responsibility, all products shall be finally inspected and accepted within thirty (30) days after arrival at point of delivery. Where seller has responsibility for installation, construction or start-up all work shall be finally inspected and accepted with thirty (30) days after completion of the applicable work by Seller. All claims whatsoever by Buyer, (including claims for shortages) except only those provided for under the WARRANTY AND LIMITATION OF LIABILITY and PATENTS Clauses, hereof, must be asserted in writing by Buyer within said thirty (30) day period or they are waived. If this contract involves partial performance, all such claims must be asserted within said thirty- (30) day period for each partial performance. There shall be no revocation of acceptance. Rejection may be only for defects substantially impairing the value of products or work and Buyer's remedy for lesser defects shall be those provided for under the WARRANTY AND LIMITATION OF LIABILITY Clause.

- B. Seller shall not be responsible for non-performance or for delays in performance occasioned by any causes beyond Seller's reasonable control, including, by way of example and not limitation, to labor difficulties, delays of vendors or carriers, fires, governmental actions, or shortages of material, components, labor, or manufacturing facilities. Any delays so occasioned shall affect a corresponding extension of Seller's performance dates, which are, in any event, understood to be approximate. IN NO EVENT SHALL BUYER BE ENTITLED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR LATE PERFORMANCE OR FOR A FAILURE TO PERFORM. Seller reserves the right to make partial shipments and to ship products, parts or work which may be completed prior to the scheduled performance date.
- C. In the event that Seller has agreed to mount motors, turbines, gears, or other products which are not manufactured by Seller and which are not an integral part of Seller's manufactured product, and a delay in the delivery of such products to Seller occurs that will cause a delay in Seller's performance date, Seller reserves the right to ship its product upon completion of manufacture and to refund an equitable portion of the amount originally included in the purchase price for mounting without incurring liability for non-performance.
- D. Seller reserves to itself the right to change its specifications, drawings and standards if such changes will not impair the performance of its products, and parts, and further those products, and parts, will meet any of Buyer's specifications and other specific product requirements which are a part of this agreement. Seller is a global supplier of products and utilizes parts and products obtained worldwide, and Seller's products supplied under this contract shall be subject to Seller's sole determination as to all manufacturing, sourcing, assembly and supply unless otherwise specifically agreed in writing.
- $\dot{\mathsf{E}}.$ The manufacture and inspection of products and parts shall be to Seller's Engineering and Quality Assurance standards, plus such other inspections or tests of documentation as are specifically agreed to by Seller. Requirements for any additional inspection, tests, documentation, or Buyer witness of manufacture, test, and/or inspection shall be subject to additional charges.

4. TITLE AND RISK OF LOSS

Title and risk of loss shall pass to buyer upon delivery of products at the designated "Ex Works" as defined by Incoterms, unless other wise agreed by the parties.

5. EROSION AND CORROSION

It is specifically understood that products and parts sold hereunder are not warranted for operation with erosive or corrosive fluids or for operation with any fluid or under any operating condition in variance with the specifications of this contract. No product or part shall be deemed to be defective by reason of failure to resist erosive or corrosive action of any fluid and Buyer shall have no claim whatsoever against Seller therefore. No product shall be deemed defective by reason of any effect on Seller's products of the action or results (such as vibration) of any goods or system (such as piping) not supplied by Seller.

6. BUYER'S RESPONSIBILITY

The design specifications of the equipment require the operation of the equipment within certain parameters and may call for the use of speed controls, safety devices, set points or other control devices to insure that the operation remains within design parameters. Buyer agrees and understands that the equipment must be operated and maintained within design specifications and operated within the specifications of the contract, irrespective of whether controls or devices are otherwise required.

7. WARRANTY AND LIMITATION OF LIABILITY.

A. Seller warrants only that its product and parts, when shipped, will be free from defects in materials and workmanship. All claims for defective products or parts under this warranty must be made in writing immediately upon discovery and, in any event, within two (2) years of shipment by seller and all claims for defective work must be made in writing immediately upon discovery. Defective items must be held for Seller's inspection and returned to the sellers' point of original shipment upon request ANY UNAUTHORIZED DISSASSEMBLY, ALTERATION OF OR TAMPERING WITH ANY PRODUCT OR COMPONENT MAY "VOID" THE WARRANTY, IN THAT SUCH ACTION WILL RESULT IN SELLER BEING RELEASED AND RELIEVED FROM ITS OBLIGATIONS UNDER THIS WARRANTY AND FOR ANY FURTHER COSTS OR ACTIONS UNDER CLAUSE 7.C, FOLLOWING, AND THE BUYER ASSUMING SOLE RESPONSIBILITY FOR THE COSTS AND RESULTS OF SUCH ACTION. THE FOREGOING IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES WHATSOEVER EXPRESS, IMPLIED AND STATUTORY, INCLUDING WITHOUT LIMITATION, THE IMPLIED, WARRANTIES OF MERCHANTABILITY AND FITNESS

B. ANY PRODUCT (S) SOLD HEREUNDER WHICH ARE NOT MANUFACTURED BY SELLER ARE NOT WARRANTED BY SELLER and shall be covered only by the express warranty, if any, of the manufacturer thereof. With respect to products and parts not manufactured by Seller, Seller's only obligation shall be to assign to Buyer, to the extent possible, whatever warranty Seller obtains from the manufacturer.

C. Upon Buyer's submission of a claim as provided above and its substantiation, Seller shall at its option either (i) repair or replace its product, part or work at the original place of shipment, or (ii) refund an equitable portion of the purchase price.

D. THE FOREGOING IS SELLER'S ONLY OBLIGATION AND BUYER'S EXCLUSIVE REMEDY FOR BREACH OF WARRANTY AND, EXCEPT FOR THE REMEDIES PERMITTED UNDER THE PERFORMANCE, INSPECTION AND ACCEPTANCE AND THE PATENTS CLAUSES HEREOF, THE FOREGOING IS BUYER EXCLUSIVE REMEDY AGAINST SELLER FOR ALL CLAIMS ARISING HEREUNDER OR RELATING HERETO WHETHER SUCH CLAIMS ARE BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), INDEMNITY OR OTHER THEORIES. BUYER'S FAILURE TO SUBMIT A CLAIM AS PROVIDED ABOVE SHALL SPECIFICALLY WAIVE ALL CLAIMS FOR DAMAGES OR OTHER RELIEF, INCLUDING BUT NOT LIMITED TO CLAIMS BASED ON LATENT DEFECTS. IN NO EVENT SHALL BUYER BE ENTITLED TO INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, NOR FOR DAMAGES FOR LOSS OF USE, LOST PROFITS OR REVENUE, INTEREST, LOST GOODWILL, WORK OR PRODUCTION STOPPAGE, IMPAIRMENT OF OTHER GOODS, INCREASED EXPENSES OF OPERATION, OR THE COST OF PURCHASING REPLACEMENT POWER OR OTHER SERVICES BECAUSE OF SERVICE INTERRUPTIONS. FURTHERMORE, IN NO EVENT SHALL SELLER'S TOTAL LIABILITY FOR DAMAGES OF BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS OR PARTS MANUFACTURED BY SELLER AND UPON WHICH SUCH LIABILITY IS BASED. ANY ACTION ARISING HEREUNDER RELATED HERETO, WHETHER BASED ON BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE) OR OTHER THEORIES, MUST BE COMMENCED WITHIN ONE (1) YEAR AFTER THE CAUSE OF ACTION ACCRUES OR IT SHALL BE

8. PURCHASER'S REPRESENTATIONS & WARRANTIES
Purchaser represents and warranties that the products(s) covered by this contract shall not be used in or in connection with a nuclear facility or application. The parties agree that this representation and warranty is material and is being relied on by seller. This provision may be modified in a separate writing signed by an officer of Price Pump Co

9. PATENTS

Seller agrees to assume the defense of any suit for infringement of any patents brought against Buyer to the extent of such suit charges infringement of an apparatus or product claim by Seller's product in and of itself, provided (i) said product is built entirely to Seller's design, (ii) Buyer notifies Seller in writing of the filing of such suit within ten (10) days after the service of process thereof, and (iii) Seller is given complete control of the defense of such suit, including the right to defend, settle and make changes in the product for the purpose of avoiding infringement of any process or method claims. Provided however, Seller will not defend any suit for infringement of a claimed patent where such alleged infringement is the result of following specific instruction furnished by Seller.

10. EXTENT OF SUPPLY

Only $\overline{\text{products as listed in Seller's proposal are included in this agreement.}$ It must not be assumed that Seller has included anything beyond same.

11. MANUFACTURING SOURCES

To maintain delivery schedules, Seller reserves the right to have all or any part of the Buyer's order manufactured at any of Sellers', sellers' licensees or sub contractors' plants, globally.

12. TERMS OF PAYMENT

Net 30 days from date of invoice.

13. ARBITRATION

In the event a dispute arises between the parties relating to or arising out of this agreement, the parties agree to attempt to have their senior management amicably settle the matter. In the event that the matter cannot be settled, the parties shall submit all disputes relating to this Agreement (whether contract, tort, products liability or otherwise) to binding Arbitration before a panel of arbitrators under the Commercial Dispute Resolution Procedures of the American Arbitration Association. Each party shall appoint an arbitrator and the third shall be selected in accordance with the rules of the American Arbitration Association. Judgment upon the award may be entered in any court having jurisdiction. The parties shall cooperate in providing reasonable disclosure of relevant documents. Each party shall bear its own expenses, and the costs and fees of the arbitration shall be borne as allocated by the Arbitrator.



FRP JACKETED STEEL UNDERGROUND STORAGE TANKS

R923-10

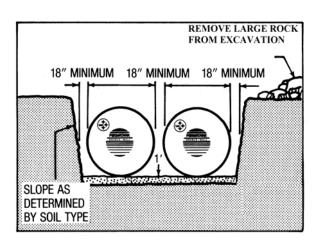
INSTALLATION INSTRUCTIONS



JANUARY 2013

1.0 EXCAVATION AND BEDDING

- 1.1 The bottom of the excavation shall be covered with a minimum of 12 inches (305 mm) of bedding, suitably graded and leveled. Bedding and backfill material surrounding the tank, to a width and depth of 12 inches (305 mm) all around the tank, shall be clean material.
- Where anchoring by means of a concrete pad, the tank shall not be placed directly on the pad. Bedding material at least 6 inches (152.4 mm) deep must be spread evenly over the dimensions of the pad to separate the tank from the pad.



- 1.3 Bedding and backfill material shall consist of homogenous pea gravel, crushed stone, clean sand, natural earthen materials, or excavatable flowable fill. Crushed stone, clean sand and natural earthen materials shall be capable of passing 100% through a 1/2 inch (13 mm) sieve and no more than 12% by dry weight through a #200 sieve (0.0029 inch (0.0754 mm)). Pea gravel shall be no larger than 3/4-inch (19 mm). Flowable fill shall meet the National Ready Mixed Concrete Association for Controlled Low Strength materials (CLSM) with strength ranging from 70 – 150 psi and shall be installed in accordance with good engineering practice. The materials shall be free of all foreign materials, such as but not limited to, bricks, metals, concrete and plastics.
- 1.4 The backfill material may be from the tank site if it meets this description, or it may be delivered to the site from another source.
- 1.5 Sand or natural earthen materials used as backfill shall be placed into the excavation in 12-18 inch (305-458 mm) vertical lifts, compacted after each lift, at least 60% up the vertical height of the tank.
- 1.6 If earthen material from the site, or other earthen material, is to be used as bedding or backfill material, a minimum of four 1 cu.ft. samples shall be taken from different locations which are representative of the backfill material and the site. Samples shall be sieved to determine if the material complies with this specification

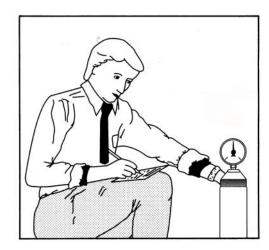
1.7 In a tidal area, the tank "bedding" material shall be crushed stone or pea gravel. Sand and natural earthen material may be used only if measures are taken to prevent washout of material during the design life of the system.

2.0 INTERSTICE VACUUM MONITORING

- 2.1 Assure tightness of tank and secondary containment in accordance with NFPA 30 through verification of vacuum within tank interstice (space in between the steel storage tank and outer fiberglass reinforced plastic (FRP) shell).
- 2.2 The tank is shipped from the factory with a minimum 13 inches Hg (44 kPa) vacuum inside the tank interstice. A vacuum gauge is factory-installed on the tank to monitor the interstice vacuum pressure. Upon delivery of the tank to the site, read and record the vacuum gauge pressure as noted on the Installation Checklist Form.

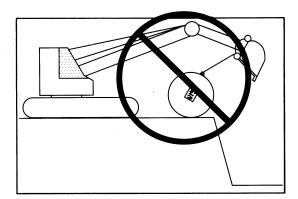
IMPORTANT: If the vacuum gauge reading has dropped 5 inches Hg (16.9 kPa) or more below the gauge reading recorded when the tank was delivered, call the tank manufacturer immediately.

NOTE: Variations in ambient air temperature, atmospheric pressure, exposure to sunlight, etc., can cause slight variations in vacuum gauge readings.

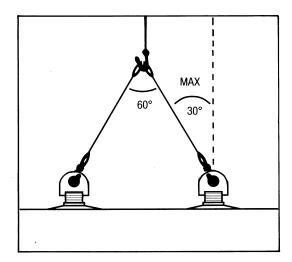


- 2.3 The vacuum gauge, at a minimum, must be read and its reading recorded in the spaces provided on the Installation Checklist for each of the following tank installation events: The vacuum gauge should also be read and recorded after the following events:
 - At time of tank delivery,
 - After backfilling to top of the tank,
 - During long-term storage activity,
 - At end of storage period before burial,
 - After tank placement in excavation.
 - After installation of monitor pipe extension to grade level.
 - After tank installation has been completed.

3. TANK HANDLING & PREPARATION



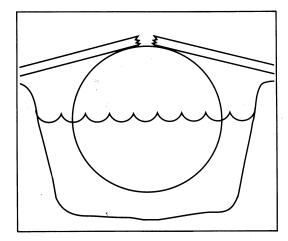
- 3.1 Equipment to handle the tank shall be of adequate size to lift and lower the tank without dragging and dropping to prevent damage to the tank.
- 3.2 The tank may arrive with factory installed removable lifting lugs for tank handling. Make sure lifting lugs are secured to the tank and positioned properly, parallel to the longitudinal centerline of the tank, before using.



- 3.3 The tank shall be carefully lifted and lowered into the excavation hole by use of cables or chains of adequate length attached to the lifting lugs provided. A spreader bar shall be used where necessary. Do not use slings, chains or cable around the tank to lift it. Do not roll or drag tank.
- 3.4 The angle between the vertical and one side of the lifting cable must not exceed a 30 degree included angle. Lift tank only at designated lift points with the lift lugs provided by the tank fabricator. Lift points are designated either by a sticker or by the presence of a lifting device.
- 3.5 Care shall be taken to prevent impact of the tank with any objects which can damage the tank, including concrete pads, deadman anchors, other tanks, tools and compaction equipment. Use of tank guide lines attached to lift lugs will provide a means of manually controlling tank movement and placement. Do not attach guide lines to the vacuum test station.
- 3.6 Do not store or place tank on sharp objects or debris. Use non-abrasive cushion-type chocks (i.e., rubber tires) to prevent tank movement during storage. For high wind conditions the tank should be tied down using non-metallic straps.

4.0 **TANK STORAGE**

- 4.1 If the tank must be temporarily stored, prior to installation, it should be placed in an area away from activity where tank damage could occur.
- 4.2 Factory-installed protective padding material on the tank should remain on the tank until it is ready to be placed in the excavation. Set the tank on the ground such that the protective material is between the tank and the ground. Installation in the excavation with the protective material is optional.
- 4.3 Tank must be installed within one year of delivery from tank manufacturer. If tank is not installed within this time period, contact tank manufacturer to recertify the tank.



ANCHORING TANK 5.0

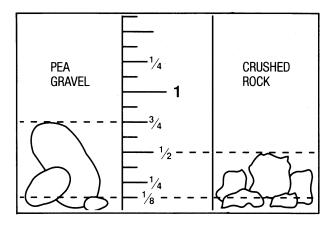
5.1

- High water tables or partially flooded excavation sites exert significant upward buoyant forces on tanks. Buoyant forces are partially resisted by the weight of the tank, the backfill and the pavement on top of the tank. Additional buoyant restraint, when required, is obtained using properly designed hold-down straps in conjunction with concrete hold-down pads or deadman anchors. The use of steel cable and round bar as hold down straps on the tank is prohibited.
- 5.2 If a metallic hold-down strap is used, a pad of inert insulating di-electric material must be used to insulate the hold-down strap from the tank. The separating pad shall be wider than the hold-down straps, which will prevent direct contact between the straps and the tank shell. This pad is not required if the hold-down strap is fabricated from non-conductive material.
- 5.3 The hold-down strap at the end of the tank shall be located at a distance of not more than D/4, where D is the tank diameter. The remaining hold-down straps shall be spaced out approximately equally.
- 5.4 Ballasting the tank may be necessary. When water is used as the ballast material, it shall only be potable water and shall not remain in the tank longer than 60 days. During construction, adequately vent all tank spaces. If product is used as ballast, proper precautions must be taken to prevent fires, spills, leaks, and other associated accidents. Monitor product level frequently to ensure there has been no unaccounted loss of product. Do not over tighten hold-down straps beyond snug and do not retighten hold-down straps after ballasting.

STRAP WRAP STEEL FLATBAR ANCHOR STRAP

6.0 BACKFILL

6.1 Homogeneous backfill similar to bedding material shall be placed carefully around the entire tank to create a uniform homogeneous environment.



- 6.2 Special care shall be taken when installing backfill along the bottom sides of the tank to ensure that the tank is not damaged and is fully and evenly supported around the bottom quadrant.
- 6.3 The backfill material shall be carefully placed and consolidated along the bottom, under the tank shell, by manually shoveling and tamping.
- 6.4 The initial 2 feet (610 mm) of backfill shall be completed in 12 inch (305 mm) maximum lifts, uniformly placed around the tank. Light hand-operated compaction equipment is recommended for all sand backfills to at least 3 feet (920 mm) above the tank.

7.0 TANK EQUIPMENT

7.1 This tank requires venting. Refer to applicable local codes and PEI RP-100 for proper installation.

8.0 TANK PIPING CONNECTION TEST

- **8.1** One final test is necessary to assure proper installation of the pipe connections to the tank fittings. Remove all factory-installed thread protectors.
- 8.2 Pressure applied to the internal steel tank shall be 3-5 psig (20.7-34.5 kPa). Shut-off the compressed air source to the system. A soap solution shall be applied around all tank piping connections while test is being performed. Bubbles and/or foam indicates leakage. WARNING: DO NOT PRESSURIZE THE INTERSTITIAL SPACE.

8.3 After passing leak testing, release tank air pressure by allowing it to escape slowly through the connection used to pressurize the tank.

9.0 FINAL BACKFILL

9.1 Homogenous backfill shall be deposited carefully around the tank up to top of the tank and to a depth of at least 1 foot (305 mm) over the tank to avoid damage to laminate, especially where tamping is required. (See NFPA 30 or UFC and state or local codes for minimum depth of cover required prior to allowing vehicular traffic over the tanks.)

10.0 OPERATING LIMITATIONS

Operation of the tank above 120°F (49°C) requires the use of specific components and materials. The tank manufacturer must be notified, prior to tank use, of the owner's intent to operate this tank above 120°F (49°C) so that proper components and materials can be incorporated.

10.1 When the product stored is heated, the temperature inside the tank shall be constantly monitored to assure the maximum allowable temperature is not exceeded.

11.0 MAINTENANCE

- 11.1 The primary tank shall be inspected monthly for the presence of water. Inspection shall take place at the lowest possible points inside the primary tank. Remove any water found. Water and sediment in fuel can cause plugging of filters. Also, bacterial growth, originating from the fuel, can cause filters to plug and corrosion of tanks and lines. For procedures on how to check for the presence of water and removal of water, refer to API Recommended Practice 1621, Appendix D and API Standard 2610. Another source of information is a report by the US Department of Energy, Brookhaven National Laboratory BNL 48406, provides information on methods to test for and remove water, test for bacterial presence in fuel tank cleaning and fuel additives.
- 11.2 Safety considerations and controls should be established prior to undertaking physical activities associated with USTs. Some hazards associated with USTs are, but not limited to, confined space entry, cleaning, inspection, moving and any other aspect of in-service work.
- **11.2.1** Contact tank manufacturer before moving tank for information on recertifying tank for continued use.

Disclaimer

These instructions are intended only as an aid to tank installers who are knowledgeable and experienced in underground tank installation. Compliance herewith does not necessarily meet the requirements of applicable federal, state and local laws, regulations and ordinances concerning tank installation. STI makes no warranties, express or implied, including but not limited to any implied warranties of merchantability or fitness for a particular purpose, as a result of these installation instructions.

Contact STI for the latest version of these Installation Instructions or visit the STI website at www.steeltank.com.

Permatank® Installation Final Precision Test

- 1. The vacuum for the test shall be a minimum of 13-inches of Hg at the start.
- 2. Test period shall be 12 hours for 10,000 gallon and smaller tanks and 24 hours for larger tanks.
- 3. Vacuum decreases of less than 5-inches of Hg during test period indicate that the tank is tight. Record vacuum change, if any, in the space provided on Installation Checklist.
- 4. A vacuum decrease of more than 5-inches of Hg during test period requires further investigation.
- 5. If further investigation is required, the tank manufacturer shall be contacted. After investigation is complete, this test shall be repeated.
- 6. The test procedure meets Environmental Protection Agency (EPA) requirements for tightness testing of underground storage tanks for empty tanks in dry excavations.

Interstitial Tightness Testing Method: Permatank®

Version: Installation Test

Certification of Results

I certify that the interstitial monitor was installed and operated according to the vendor's instructions. I also certify that the evaluation was performed using methods which meet the requirements of the Alternative EPA fest procedures as they are applied to interstitial monitors and that the results presented above are those obtained during evaluation.

H. Kendall Wilcox, president	Ken Wilcox Associates, Inc.		
(printed name)	Ken Wilcox Associates, Inc. (organization performing evaluation) Blue Springs, MO 64015 (city, state, zip) (816) 229-0860		
H. Kendall Wilear	Blue Springs, MO 64015		
(signature)	(city, state, zip)		
March 25, 1993	(816) 229-0860		
(date)	(phone number)		



FRP JACKETED STEEL UNDERGROUND STORAGE TANKS



Installation Checklist

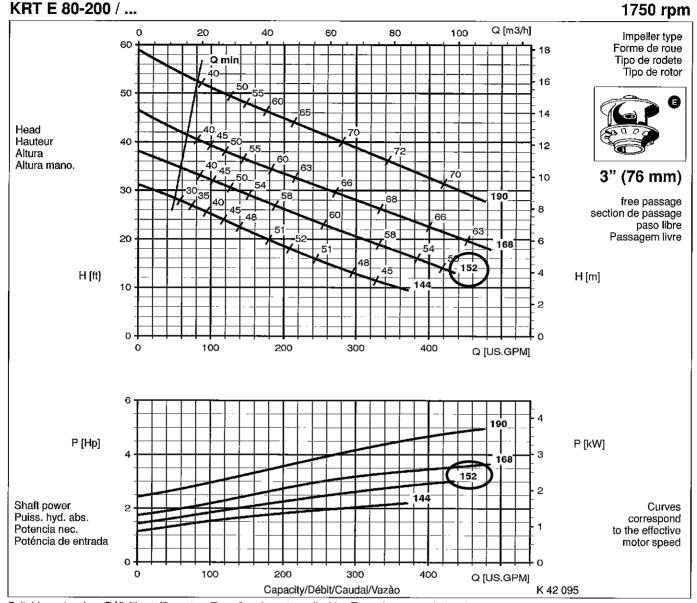
JUNE 2010

This checklist must be completed by the installation contractor and returned to the tank owner.

Owner of Tank:	Permatank [®] Label No Delivery Date:
Installation Company:	Tank Capacity: gallons(I)
Installation Company:	Diameter:ieet(m); Length:ieet (m)
Product to be stored:	-
• HANDLING	BACKFILL
- Lift equipment used	- Material: clean sand pea gravel#8 stone
- Lifting capacity Lbs.(Kg) - Type of chocks used if tank was stored	- Depth of homogenous material beneath tank inches
- Type of chocks used if tank was stored	
- Describe any damage observed	bottom quadrant
- Action taken	TANK PIPING CONNECTION TEST
	- Pipe fittings air-tested at 5 psig (34.5 kPa) while applying soap
• EXCAVATION	solution onto fittings to check for leaks
- Length Width Depth	•
- Burial depth top of tank to grade inches(mm)	• INTERSTITIAL VACUUM GAUGE READINGS AT:
- 12 inches (305 mm) minimum around each tank	Tank Delivery inches (kPa) of Hg Date:
(Check when complete)	Driver signature
- Burial depths meet minimum code requirements	Driver signature Date:
(reference NFPA 30, UFC)	after backfill to tank top inches (kPa) of Hg
NOTE: Check with tank manufacturer when burial depth exceed	after backfill to tank top inches (kPa) of Hg ls Other readings obtained inches (kPa) of Hg
5 feet.	
	(Signature of Installing Foreman or Project Engineer)
ANCHORING USED (Check One)	- DIDINO HOED (OL. 1. II.d. (I.)
Concrete Pad Deadman OR Soil and pavement overburden will hold do	PIPING USED (Check all that apply)
	Non-conductive Metallic
(reference PEI/RP 100-90)	Secondary containment usedFlexible
- Number of hold-down straps Widthinches(mm)	
- Protective pads used under straps	Yes No
Protective pad at least 2 inches (50 mm) wider than width of hol	(Signature of Installing Foreman or Project Engineer)
down strap, or wrap around type pad used - 1 foot (304 mm) of backfill material under tank OR	
- 6 inch (152 mm) separation when concrete pad is used	
- 6 Inch (132 min) separation when concrete pad is used	COMMENTS.
C/LI	TANK OWNER'S MAILING ADDRESS:
944 Donata Court Stee	Street
Lake Zurich IL 60047	City
	City State ZipTelephone
Phone: 847-438-8265 Institute	otatotipi dichilolic

Note: This checklist includes certain key steps in the proper installation of a double wall steel underground storage tank with FRP secondary containment and is intended only as an aid to tank installers who are knowledgeable and experienced in underground tank installation. Compliance herewith does not necessarily meet the requirements of all applicable federal, state and local laws, regulations and ordinances concerning tank installation. TANK OWNER - A COPY OF THIS CHECKLIST SHOULD BE RETURNED TO YOU BY THE INSTALLER FOR RETENTION WITH YOUR PERMANENT RECORDS.





Suitable motor sizes/Définition taille moteur/Tamaños de motor aplicables/Tamanhos apropriados de motores

MOTOR RATING Material G	MAX. LIQUID TEMP.	MOTOR CODE	
Hp (kW)	ºF (ºC)		
1.75 (1.3)	104 (40)	1 4 U2G 1 4 X2G (FM)	
2.4 (1.8)	104 (40)	24UG 24XG (FM)	
	140 (60)	2 4 WG	
3.4 (2.5)	104 (40)	2 4 UG 2 4 XG (FM)	
3.4 (2.3)	140 (60)	34 WG (FM)	4
5.0 (5.7)	104 (40)	3 4 UG 3 4 XG (FM)	

(FM) = Explosionproof to Class I, Division 1, Groups C & D (Explosionproof according to IEC 79 (EEx d II B) on request).

Project Customer pos.no Project ID Pos.no Created by



Page 2013-07-22

Data sheet

KRT E 80-200/34WG-S **Pump type**

Operating data

Flow Head Operating speed Shaft power Efficiency Required pump NPS Head H(Q=0) Application range	H From	172 28.9 1750 2.48 50.7 41.9 Head 37.3	US g.p.m. ft rpm hp % ft ft	Fluid Density Viscosity Tempera	У	62.3 1.08E-5 68	Ib/ft³ ft²/s °F
	Го	12.3	ft	409	US g.p.m.		
l	10	12.3	IL	409	03 g.p.m.		

Design

Make	KSB	Impeller type	Single vane impeller				
Design	Submersible pump		Closed				
Series	KRT E	Impeller size	(159) 6 ¹ / ₄	inch		
Frame size	80-200	·	Max. (192) 79/16	inch		
Stages	1		Min. (141) 59/16	inch		
Curve number	25.01.2012 09:42.18,492	Free passage		3	inch		
		Weight		208.99	lb		
Type of bearings	Antifriction						
Nos. of bearings	2						
Lubrication	Grease lubrication. lubricated	e lubrication. lubricated for lifetime					
Suction port	Pressure rating	•••					

Pressure rating Suction port Flange size DN0 Flange size DN1 3" Norm

CLASS 125 Pressure rating Flange size DN2 3 inch

Flange size 4 inch DN3 Norm ASME/ANSI B16.1

Suction port: pump,

Materials

Discharge port

Pump casing Grey cast iron EN-JL1040 (A 48 Class 35)

Discharge cover

Impeller Grey cast iron EN-JL1040 (A 48 Class 35)

Stainless steel EN-1.4021+QT800 (A 276 Type 420) Shaft

Grey cast iron EN-JL1040 (A 48 Class 35) Bearing bracket Grey cast iron EN-JL1040 (A 48 Class 35) Motor casing Stainless steel A4 (EN-1.4571) (A 276 Type 316) Bolts. nuts

Shaft protection sleeve

Casing wear ring Impeller wear ring Stainless steel EN-1.4021+QT800 (A 276 Type 420)

discharge port: discharge elbow

Nitrile rubber (NBR) O-Rings

KSB Inc., 4415 Sarellen Road, Richmond, Virginia 23231, Phone: 001-804-222-1818, Fax: 001-804-226-6961

KSB Pumps Inc, 5885 Kennedy Road, Mississauga, Ontario L4Z 2G3 (Canada), Phone: (0905) 568-9200, Fax: (0905) 568-9120

KSB Aktiengesellschaft, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com

Project Customer pos.no Project ID Pos.no Created by



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Data sheet

Pump type

Shaft seal

Type of seal Arrangement: Seal on medium side Mechanical seal. pump-side Mechanical seal. bearing-side Double mechanical seal Tandem with elastomer bellows Silicon carbide / Silicon carbide Carbon / Silicon carbide

KRT E 80-200/34WG-S

Monitoring

Thermal winding protection
Explosion proof protection
Motor housing monitoring
Mechanical seal leakage detection
Bearing temperature monitoring

By temperature sensitive switches

Coating

Preparatory treatment
Blasting method
Primer
Dry film thickness primer
Top coat
Solids content
Dry film thickness top coat
Color

SSPC near white SP 10 Steel grit blasting Zinc phosphate or Zinc dust > 1 1/2 mils (35 microns) 2-component epoxy resin > 82 % > 6 mils (150 microns) Ultramarine Blue

Installation

INSTALLATION
Type of installation:

Discharge elbow size (DN2/DN3):
Flange to suit:
Claw:
Installation depth:
Guide system:
Guide max. deviation:
Lifting device:
Length of lifting device:
Lifting loops:
Installation accessories:

Wet well installation designed for automatic connection to a permanently installed discharge elbow 3 inch / 4 inch ASME/ANSI B16.1, CLASS 125 Bolted to the pump 15 ft (4.5 m) Double pre-stressed guides +/- 5 degree from the vertical galvanised lifting chain 16 ft (5 m) Every 3 ft (1 m) Discharge elbow, 3 inch / 4 inch fasteners, claw, bracket, lifting chain stainless steel guides

Materials:
Discharge elbow:
Claw:
Bracket:
Guides:
Lifting device:

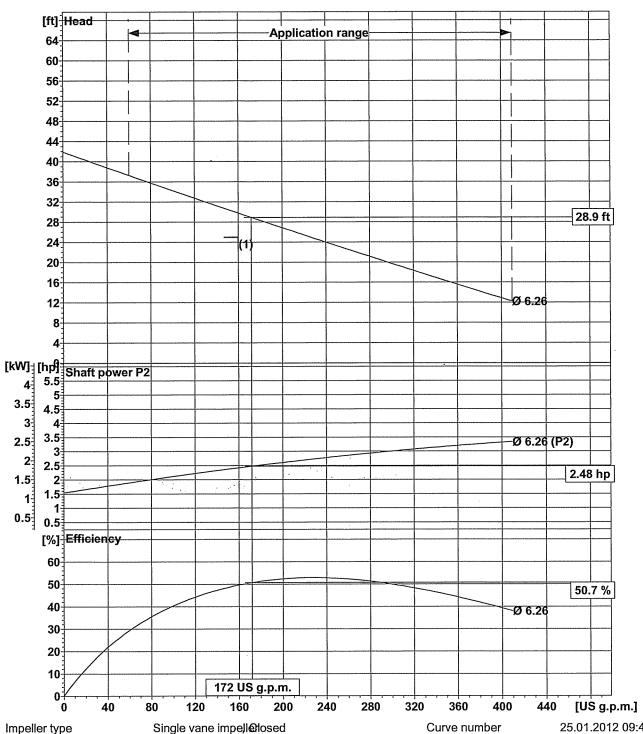
Grey cast iron EN-JL1040 (A 48 Class 35) Grey cast iron EN-JL1040 (A 48 Class 35) Grey cast iron EN-JL1040 (A 48 Class 35) Stainless steel EN-1.4401 (A 276 Type 316) Galvanised steel EN-1.0038+Z (A 283 Grade B Galv.) Project Customer pos.no Project ID Pos.no Created by



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Performance curve

Pump type KRT E 80-200/34WG-S



Impeller type Free passage

3"

Density of fluic62.322 lb/ft3

Curve number Frequency

25.01.2012 09:42.18,492

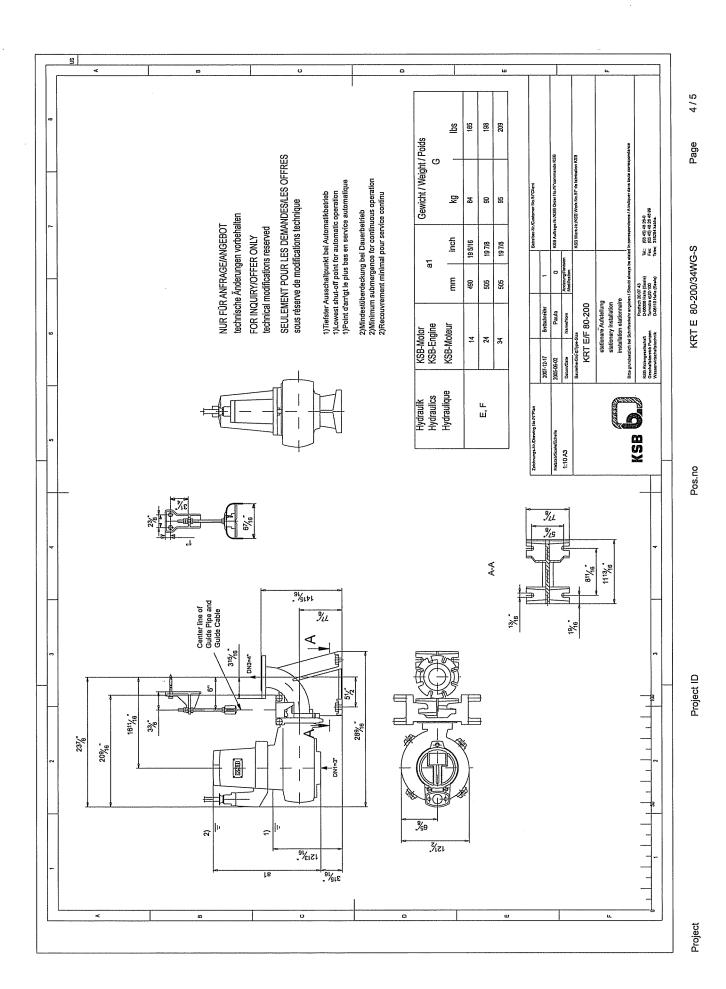
Impeller size

61/4"

Viscosity (159)

1.082E-5 ft²/s

60 Hz 1750 1/min Speed



Project Customer pos.no Project ID Created by Pos.no



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Data sheet: Motor data

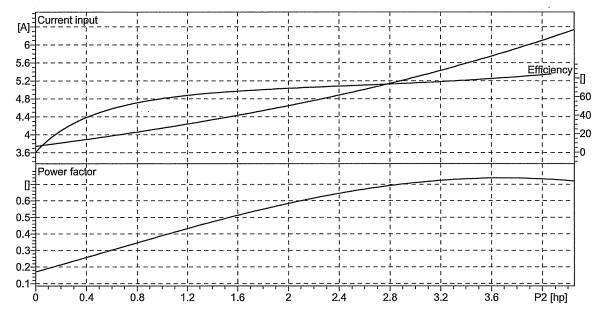
Motor type

34WG

Motor manufacturer	KSB Aktiengesellschaft	Rated voltage	460	V
Design acc. standard	NEMA MG1 Design B	Rated frequency	60	Hz
Service factor	1.15	Rated HP (D.O.L) or VFD	3.4	hp
Degree of protection	IP68	Rated current	5.7	À
Insulation class	F	Nominal speed	1750	rpm
Starting mode	Direct	NEMA code letter	J	
No. starts / h	30	Starting to rated current	5.4	
Coolant temperature	= 140 °F (60 °C)</td <td>Starting current</td> <td>30.8</td> <td>Α</td>	Starting current	30.8	Α
Motor casing	Grey cast iron EN-JL1040 (A 48 Class 35)			
Explosion protection				
Pump type	KRT E 80-200/34WG-S			

Load	P1	P2	eta	cos phi	I
	kW	hp	<u></u> %		A
4/4	3.34	3.4	76.0	0.73	5.7
3/4	2.59	2.5	73.5	0.66	4.9
2/4	1.87	1.7	67.7	0.53	4.4
1/4	1.19	0.8	53.2	0.36	4.2

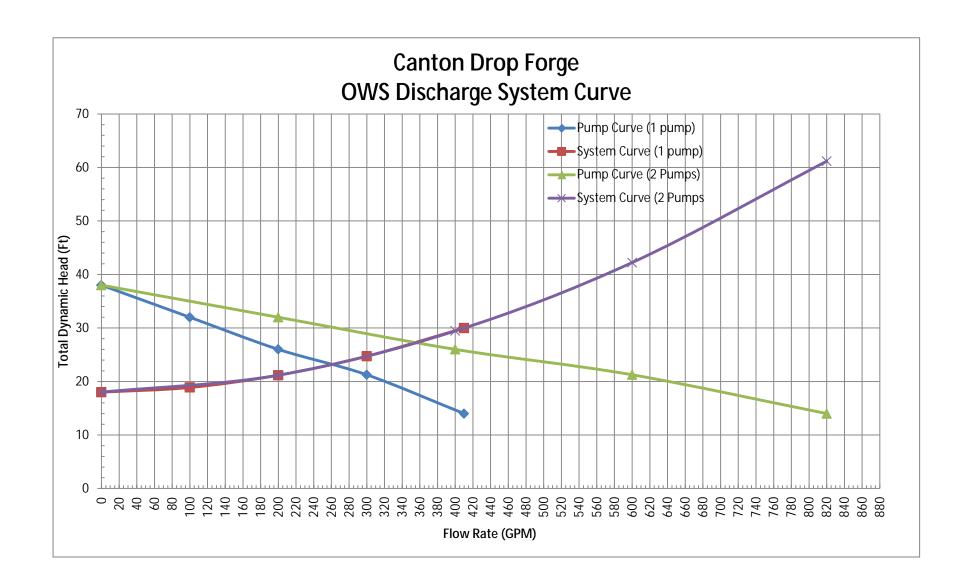
Main cable1 x AWG15-8Diameter0.65..0.75 inchControl cableDiameterCable. outer sheathWaterproof synthetic rubber compoundCable length15 m



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KSB Aktiengesellschaft, Turmstrasse 92, 06110 Halle (Germany), Phone +49 (345) 48260, Fax +49 (345) 4826 4699, www.ksb.com



Attachment C Retained Pond Water Analytical Summary

Attachment C

Retained Storm Water/Process Water (Pond Water) Analytical Summary Canton Drop Forge

Analytical Group	Chemical	IA07-SW01 10/08/2012	IA07-SW02 10/08/2012
METALS (DISSOLVED)	ARSENIC-DISS UG/L	32	25
METALS (DISSOLVED)	BARIUM-DISS UG/L	180 JB	190 JB
METALS (DISSOLVED)	CADMIUM-DISS UG/L	2.0 U	2.0 U
METALS (DISSOLVED)	CHROMIUM-DISS UG/L	5.0 U	5.0 U
METALS (DISSOLVED)	LEAD-DISS UG/L	3.0 U	3.0 U
METALS (DISSOLVED)	MERCURY-DISS UG/L	0.20 U	0.20 U
METALS (DISSOLVED)	SELENIUM-DISS UG/L	16	10
METALS (DISSOLVED)	SILVER-DISS UG/L	5.0 U	5.0 U
PCB AROCLORS	AROCLOR 1242 UG/L	0.50 U	0.48 U
PCB AROCLORS	AROCLOR 1248 UG/L	0.50 U	0.48 U
PCB AROCLORS	AROCLOR 1254 UG/L	0.50 U	0.48 U
PCB AROCLORS	AROCLOR 1260 UG/L	0.50 U	0.48 U
SEMI-VOLATILE	1,2-DICHLOROBENZENE UG/L	1.0 U	0.95 U
SEMI-VOLATILE	2-METHYLNAPHTHALENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	3 & 4 METHYLPHENOL UG/L	2.0 U	1.9 U
SEMI-VOLATILE	ACENAPHTHENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	ACENAPHTHYLENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	ANTHRACENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BENZO[A]ANTHRACENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BENZO[A]PYRENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BENZO[B]FLUORANTHENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BENZO[G,H,I]PERYLENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BENZO[K]FLUORANTHENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	BIS(2-ETHYLHEXYL) PHTHALATE UG/L	2.2	1.9 U
SEMI-VOLATILE	CHRYSENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	DIBENZ(A,H)ANTHRACENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	DIBENZOFURAN UG/L	1.0 U	0.95 U
SEMI-VOLATILE	DIETHYL PHTHALATE UG/L	1.0 U	0.95 U
SEMI-VOLATILE	DI-N-BUTYL PHTHALATE UG/L	1.0 U	0.95 U
SEMI-VOLATILE	FLUORANTHENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	FLUORENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	INDENO[1,2,3-CD]PYRENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	NAPHTHALENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	N-NITROSODIPHENYLAMINE UG/L	1.0 U	0.95 U
SEMI-VOLATILE	PHENANTHRENE UG/L	0.20 U	0.19 U
SEMI-VOLATILE	PHENOL UG/L	1.0 U	0.95 U
SEMI-VOLATILE	PYRENE UG/L	0.20 U	0.19 U

Notes:

Bold = Analyte detected above method detection limit

J = Positive concentration detected below the laboratory reporting limit, but above the method detection limit. Concentration is an estimated value.

B = Analyte also detected in the associated laboratory method blank

U = Result was nondetect at reporting limit

Attachment C

Retained Storm Water/Process Water (Pond Water) Analytical Summary Canton Drop Forge

Analytical Group	Chemical	IA07-SW01 10/08/2012	IA07-SW02 10/08/2012
VOLATILES	1,1,1-TRICHLOROETHANE UG/L	1.0 U	1.0 U
VOLATILES	2-BUTANONE (MEK) UG/L	0.99 J	1.5 J
VOLATILES	2-HEXANONE UG/L	10 U	10 U
VOLATILES	4-METHYL-2-PENTANONE (MIBK) UG/L	10 U	10 U
VOLATILES	ACETONE UG/L	6.6 J	10
VOLATILES	BENZENE UG/L	1.0 U	1.0 U
VOLATILES	BROMODICHLOROMETHANE UG/L	0.31 J	0.46 J
VOLATILES	CARBON DISULFIDE UG/L	1.0 U	1.0 U
VOLATILES	CHLOROFORM UG/L	0.60 J	0.99 J
VOLATILES	CIS-1,2-DICHLOROETHENE UG/L	1.0 U	1.0 U
VOLATILES	DIBROMOCHLOROMETHANE UG/L	0.42 J	0.50 J
VOLATILES	ETHYLBENZENE UG/L	1.0 U	1.0 U
VOLATILES	METHYLENE CHLORIDE UG/L	1.0 U	1.0 U
VOLATILES	N-HEXANE UG/L	1.0 U	1.0 U
VOLATILES	STYRENE UG/L	1.0 U	1.0 U
VOLATILES	TETRACHLOROETHENE UG/L	1.0 U	1.0 U
VOLATILES	TOLUENE UG/L	0.69 J	0.28 J
VOLATILES	TRICHLOROETHENE UG/L	1.0 U	1.0 U
VOLATILES	VINYL CHLORIDE UG/L	1.0 U	1.0 U
VOLATILES	XYLENES, TOTAL UG/L	2.0 U	2.0 U

Notes:

Bold = Analyte detected above method detection limit

J = Positive concentration detected below the laboratory reporting limit, but above the method detection limit. Concentration is an estimated value.

B = Analyte also detected in the associated laboratory method blank

U = Result was nondetect at reporting limit



Certificate of Analysis

September 10, 2013

Laboratory No. 13–09–11–21

Company CANTON DROP FORGE

Address 4575 SOUTHWAY STREET S.W., CANTON, OH

Engineer ROBERT RABE **Sample Date** ROBERT RABE September 5, 2013

Sample Class Waters

	BOILER			COOLING
Analysis	BLOWDOWN	DEEP WELLS	POND #3	WATER
pH	11.68	7.81	8.59	8.02
Conductivity, µmho	4164	1152	1302	950
"P"-Alkalinity, as CaCO ₃ , mg/L	384	_	32	_
"M"-Alkalinity, as CaCO ₃ , mg/L	520	321	215	175
Calcium Hardness, as CaCO ₃ , mg/L	6.3	314	225	178
Magnesium Hardness, as CaCO ₃ , mg/L	1.2	131	122	135
Iron, as Fe, mg/L	< 0.05	0.07	< 0.05	< 0.05
Copper, as Cu, mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Zinc, as Zn, mg/L	< 0.05	< 0.05	< 0.05	< 0.05
Sodium, as Na, mg/L	877	67	157	84
Potassium, as K, mg/L	27	3.6	8.1	4.2
Chloride, as Cl, mg/L	835	140	223	150
Sulfate, as SO ₄ , mg/L	553	92	125	95
Nitrate, as NO ₃ , mg/L	<1.0	<1.0	<1.0	< 0.10
Ortho-Phosphate, as PO ₄ , mg/L	4.2	< 0.50	< 0.50	< 0.50
Silica, as SiO ₂ , mg/L	18	16	12	16

Respectfully Submitted,

Joel Phillips

Manager Applied Technology Analytical Lab ChemTreat, Inc.

CC: ROBERT RABE

Page 1



Certificate of Analysis

September 10, 2013

Laboratory No. 13–09–11–21

COMPANY CANTON DROP FORGE

Address 4575 SOUTHWAY STREET S.W., CANTON, OH

Engineer ROBERT RABE **Sample Date** ROBERT RABE September 5, 2013

Sample Class Waters

	POND #1 POST OIL/H2O
Analysis	SEPARATOR
pH	7.84
Conductivity, µmho	998
"P"-Alkalinity, as CaCO ₃ , mg/L	_
"M"–Alkalinity, as CaCO ₃ , mg/L	186
Calcium Hardness, as CaCO ₃ , mg/L	211
Magnesium Hardness, as CaCO ₃ , mg/L	135
Iron, as Fe, mg/L	< 0.05
Copper, as Cu, mg/L	< 0.05
Zinc, as Zn, mg/L	< 0.05
Sodium, as Na, mg/L	77
Potassium, as K, mg/L	5.2
Chloride, as Cl, mg/L	157
Sulfate, as SO ₄ , mg/L	100
Nitrate, as NO ₃ , mg/L	< 0.10
Ortho-Phosphate, as PO ₄ , mg/L	< 0.50
Silica, as SiO ₂ , mg/L	17

Attachment D Permit-to-Install (PTI) Forms

- n Form A Plan Approval Application
- n Form B6 Industrial Indirect Discharger Facility

Form A

Permit-to-Install/Plan Approval Application						
			FOR AGENCY	USE ONLY		
Date Received:	/ /	Applicat	tion/Revenue II	D:	Organization ID:	
Document ID:		Place ID	D:		Check ID:	
Check Date:	/ /	Check N	Number:		Check Amount:	
1. Project Name:	Oil-Water Sep	paration Improve	ments; Proces	ss Water Discharge to	Sanitary Sewer	& Reuse
2. Applicant (see	note after sign	ature)				
Name:	Canton Drop	Forge				
Mailing Address:	4575 Southw	ay Street SW				
City: Canton	-	-	State: Ohio		Zip: 44706	
Contact Name:	Brad Ahbe					
Title:	President					
Phone: (330)	477-4511 Fa	ax: (330) 477-204	46 E-mail :	bahbe@cantondropfo	rge.com	
3. Application/Pla	ns Prepared	by:				
Name:	TRC Environ	•				
Mailing Address:	-					
City: Ann Arbor			State: Mich	igan	Zip: 48108	
Contact Name:	David McKen	nzie			'	
Title:	Sr. Proiect Er	ngineer/Manager				
		ax: (734) 971-902	22 E-mail :	dmckenzie@trcsolutio	ons.com	
(())		(()) ()				
4. Billing Address	(if different th	an Annlicant)				
Name:	y (ii dinerent tri	ин тррпоин,				
Mailing Address:						
City:	·		State:		Zip:	
Contact Name:					zıp	
Title:						
			E-mail :			
Phone: ()	Fa	ix. () -	=-IIIaII .			
5. Future Owner (if different that	n Applicant)				
Name:						
Mailing Address:						
City:			State:		Zip:	
Contact Name:						
Title:						
Phone: ()	- Fa	ax: () -	E-mail :			

6. Project Location					
Street Address or Location Description: 4575 Southway Street	et SW				
County: Stark Township	p: Perry				
Municipality: City of Massillon	Latitude:	40.782333	Longitude:	-81.431	1473
Method of Determination: Bing Maps					
7. Brief Project Description: Installation of oil-water separatio system and/or to facility reuse.	n improveme	ents; discharge o	of process water	to sanitar	y sewer
8. Will one or more acres be disturbed during construction	of this proje	ect?			☐ No
If Yes, enter the date the NOI for coverage under the construc	tion storm wa	ater NPDES per	mit		
was submitted: 06/24/2013 and the date coverage was	granted:	08/01/2013			
9. Will wetlands be disturbed during construction of this pr	oject?			☐ Yes	⊠ No
If Yes, enter the date the 401/404 permit application was subr	mitted: /	/			
40 a la this application part of a combined permit to install	annliantian	2 /for everyle s	-i	□ Vaa	M Na
 10 a. Is this application part of a combined permit-to-install b. Has an application for a Class V injection well permit I If Yes, date submitted:/_/ 		` .	air + water) ☐ Yes	☐ Yes	⊠ No ⊠ N/A
44 Commission of Status					
Compliance Status Will this project connect to a collection/treatment system that	has a NPDF	S nermit?			□ No
If Yes , list federal and state permit numbers:	l las a Ni DE	o permit:	I	<u> </u>	
OH 3PE00007*LD		do avo o		□ Vaa	✓ Na
b. Is this application filed in compliance with findings and orders and/or NPDES permit schedule?	s, a consent o	зесгее,		∐ Yes	⊠ No
If Yes, effective date of the document containing the schedu	le: /	/			
12. Compliance with 208 plan					
Does the project conform to the 208/201 plan for the area?			☐ Yes	☐ No	⊠ N/A
If Yes, has the engineer submitted supporting documentation	n?		☐ Yes	☐ No	
13. Designated Ohio, Wild, Scenic, & Recreational Rivers					
Is this project located within 1000 feet of a designated wild, scen	nic, and recre	eational river?	☐ Yes	⊠ No	
See http://ohiodnr.com/?TabId=985 for additional information	•				
14. Estimated Project Schedule:					
Beginning construction date: 10/1/2013 Ending construction	n date: 2/28	3/2014 Beginn	ning operation da	ite: 3/1	/2014
15. Project Cost:					
*Installation/Construction Cost: \$600,000	(Mark on	e): Actu	ıal 🗌 Bid	⊠ E	stimate
Annual Operation/Maintenance Cost (if applicable - this project	 only):	25,000			
Are Water Pollution Control Loan Funds going to be used for	this project?			Yes	☐ No
If No , Funding Source:					
*This is costs of the treatment/dispersal/collection system that will serv	e the project				

16. Attachments		
The following are included in this application package (che provided):	ck appropriate box(es) and indicate h	now many copies of each are
Detail Plans 4 sets	☐ Management Plan	
Soil Evaluation Form		2 copies
Hydrogeologic Site Investigation Report	Engineering Specifications	
☐ Site Evaluation Form	<u>—</u>	To be issued
Other (describe):	Antidegradation Addendum	
☐ Narrative Plans (LTCP, GP, etc.)		
17. Form B / C Submission (check all that apply):		
Sewer and Pump Station Construction – Form B1		
Onsite Sewage Treatment Systems – Form B2		
Wastewater Treatment Plants Less Than 100,000 GPI	D – Form B3	
Wastewater Treatment Plants Greater Than or Equal t		ns – Form B4
☐ Industrial Direct Discharge Facility – Form B5	io roo,ooo or b' and an r ond cyclon	1 6 2 1
☐ Industrial Indirect Discharge Facility – Form B6		
☐ Underground Storage Tank Remediation – Form B7		
☐ Holding Tanks – Form B8		
☐ Industrial Impoundment Ponds – Form B9		
Land Application Management Plan for Sludge or Was	eta other than Treated Sowage — For	rm C1
☐ Treated Sewage Land Application Management Plan -		
Sewage Holding Tank Management Plan – Form C3	- 1 OIIII G2	
Sewage Holding Tank Wanagement Flan - Form CS		
18. Fee Calculations:		
Permit-to-Install (maximum total fee \$15,100)	•	
a. Application fee:	\$ 100.00	
b. Plan review fee:	\$ 100.00	
c. Plan review fee (installation/construction cost x .0065):		
d. Total Fee (a + b + c):	\$ 4100.00	
Sludge Management Plan Approval*		
a. Application fee:	\$ 100.00	
b. Plan review fee:	\$ 100.00	
c. Total fee (a + b):	\$ 200.00	
* No separate fee is needed for land application		
19. Antidegradation		
Is this project subject to the Antidegradation Rule (OAC 374	45-1-05)?	☐ Yes ⊠ No
If Yes , an antidegradation addendum must be submitted (N	Note: It applies even if an exclusion ar	nd/or waiver is met)
If No, check all that apply:		
Application with no direct surface water discharge i.e., onsite sewage treatment systems, sanitary so		
Renewal NPDES application or PTI application wit	th no requested increase in loading of	f currently permitted pollutants.
☐ Narrative Plans (Examples: LTCP, Land Application	on, General Plans, etc.)	

20.	0. Submittals:		
То	o be considered complete, this application must include the follow	ving	unless otherwise directed by Ohio EPA:
\boxtimes	Four copies of the detail plans including profile and plan views applicable) and proposed pump station facilities, incorporating Recommended Standards for Wastewater Facilities.	of all	all sewers (shown on the same sheet), existing (as of the details outlined in Section 20.1, 20.2 and 20.3 of
\boxtimes	▼ Two copies of complete technical specifications.		
\boxtimes	Two copies of the Permit-to-Install Application including Form addendum (if applicable)	А, р	pertinent B & C form(s), and the antidegradation
\boxtimes	☐ Fee check payable to "Treasurer, State of Ohio."		
21.	1. Signature of the Applicant (see Ohio Administrative Code 3	45	42-03)
all t	certify under penalty of law that this document and all attachmen Il the information submitted is, to the best of my knowledge and bubstantial penalties for submitting false information, including the	elie	f, true, accurate, and complete. I am aware that there are
Typ	yped name: Brad Ahbe Ti	le:	President

NOTE (Who Must Sign):

Signature:

The person signing as "Applicant" is not the applicant's engineer or architect or any other person submitting the Permit-to-Install Application on behalf of the owner. The "Applicant" should be owner of the facility, business, corporation, company, etc. or the legal responsibly entity. It is not the engineer who prepared the plans.

Supplement to Form A – B6

Permit-to-Install/Plan Approval Application

Industrial Indirect Discharger Facility

	FOR AGENCY USE ONLY		
Application Number:	Date Received:	/ /	
Applicant: Canton Drop Forge			
Facility Owner:			
Application/Plans Prepared by: TRC Environm	nental Corp.		
Project Name: Oil-Water Separation Improven	nents; Process Water Discharge to Sa	nitary Sewer & Reuse	
1. POTW to Receive Discharge			
Name: City of Massillon			
Address: 100 Big Indian Drive Southwest			
City: Massillon	State: OH	Zip: 44646	
NPDES Permit Numbers: OH 3PE00007	*LD		
2. Industrial Discharger Information			
a. Do categorical regulations apply?	☐ Yes ☒ No		
b. Specify waste streams. Where categorical i		iate 40 CFR part	
(if more waste streams than space provided, a	ttach additional sheet).		
Waste Stream	Flow Rate (average gpd)	40 (CFR
c. Design Performance Criteria (Quality of Efflu	lent from Proposed Facility)		
Parameter	Units	Maximum	Average
Oil & Grease	ppm	15	10
	• • • • • • • • • • • • • • • • • • • •		

3. \$	Submittals:						
Thi	s application must include the following unless directed by Ohio EPA:						
\boxtimes	Four copies of the detail plans including site plans, vicinity map, schematic diagrams, plan views, elevation views and cross-sectional views necessary to evaluate the processes.						
\boxtimes	Two copies of complete technical specifications.						
\boxtimes	Two copies of the Application including Form A, pertinent B & C form(s), and antidegradation addendum (if applicable)						
\boxtimes	Two copies of the Engineering Report.						
	One copy of POTW Approval Letter.						
4. 1	The foregoing data is a true statement of facts pertaining to this proposed industrial pretreatment installation.						
Dat	e: 9/14/13 Signed: P.E.	į					
Pla	ns prepared by: TRC Environmental Corporation						
	DAVID B. McKENZIE E-77288 CENSE ORDINATION ORDINA						



CANTON DROP FORGE INC.

4575 Southway Street SW Canton, OH 44706 JPMORGAN CHASE BANK OHIO 56-1544 441

060424

CONTROL NO.

DATE

2401194

9/17/2013

PAY

FOUR THOUSAND ONE HUNDRED AND 0/100 USA

AMOUNT

\$4,100.00

TO THE ORDER OF

TREASURER STATE OF OHIO

VOID IF NOT CASHED WITHIN 90 DAYS

non-responsive

VENDOR TREASURER STATE OF OHIO

NO. 060424

TREASURER STATE OF ONTO				00012:	
OUR REF. NO.	YOUR INV. NO.	INV. DATE	INVOICE AMOUNT	DISCOUNT TAKEN	AMOUNT PAID
PTI APPLICATI	ON PROJECT #199385	.0000			\$4,100.00
			\$0.00	\$0.00	\$4,100.00
					,